User Manual

Version 4.6

Jungo Software Technologies

User Manual: Version 4.6

Jungo Software Technologies

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Part I. Getting Started

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1

Introduction to OpenRG

OpenRG is a scalable suite of software infrastructure and technologies that Original Equipment Manufacturers (OEMs) require in order to bring Residential Gateways/Internet Access Devices (IADs) to market. OpenRG leverages a wide range of compelling broadband-based applications and services and includes an operating system, drivers and remote management capabilities. OpenRG delivers a set of highly integrated solutions, required for the home and small office, such as:

- Optimized Linux 2.6 Operating System
- IP Routing and Bridging
- Asynchronous Transfer Mode (ATM) and Digital Subscriber Line (DSL) support
- Point-to-Point Protocol (PPP)
- Network/Port Address Translation (NAT/PAT)
- Quality of Service (QoS)
- Bluetooth data support for communications with PCs, PDAs and cellular phones
- Stateful Inspection Firewall
- Wireless LAN Security: WPA, 802.1x, RADIUS client
- Virtual Private Network (VPN): IPSec, PPTP, L2TP
- Secure Socket Layer Virtual Private Network (SSL VPN)
- Universal Plug-and-Play
- File Server for Network Attached Storage (NAS) devices
- Print Server
- Web Filtering
- Carrier Grade Voice over IP (VoIP): SIP, H323, MGCP, RTP

- Management and Control: Web-based Management (WBM), Simple Network Management Protocol (SNMP), Command Line Interface (CLI), TR-069 WAN Management Protocol, TR-064-LAN-Side DSL CPE Configuration
- Remote Update
- System Statistics and Monitoring
- Development Environment and Tools, supporting the C and C++ programming languages
- Integrated Java Virtual Machine (JVM) to enable integration of Java applications for differentiated services
- Dual WAN supporting Small Business (SMB) devices with multiple WAN connections, including failover and load balancing

For the complete OpenRG specification, please go to: http://www.jungo.com/openrg/doc/4.6/spec/jungo_doc_software_specification.pdf
OpenRG is targeted at the following platforms: DSL modems, Cable modems, CPEs, IADs, Wireless access points and routers. You can view additional OpenRG documentation at: http://www.jungo.com/openrg/manuals.html#4.6 The documentation includes OpenRG Product Description, OpenRG Product Specification and OpenRG Programmer's Guide.

2

Setup

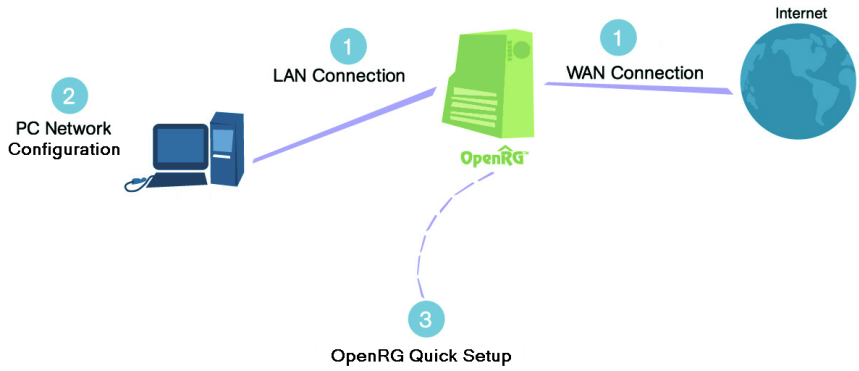

Figure 2.1. Hardware Configuration

1. Setting up WAN and LAN connections [Section 2.1]
2. PC network configuration [Section 2.2]
3. OpenRG Quick Setup, via the Web-based management [Section 4.4]

2.1. Setting up the WAN and LAN connections

- **WAN Connection**

  Your connection to the Internet is determined by the type of gateway that you have. If your gateway has a built-in DSL modem, connect its DSL socket to the wall socket using a telephone cable. If it has an Ethernet socket for the Wide Area Network (WAN), connect it to the external modem you have, or to the Ethernet socket you might have, using an Ethernet cable. Consult your modem documentation regarding specific cables necessary for connection.

- **LAN Connection** Your computer can connect to the gateway in various forms (Ethernet, USB, Wireless etc.), each requiring a different physical connection, if any in case of Wireless. The most common type of connection is Ethernet, with most platforms featuring four such ports. Use an Ethernet cable to connect between an

Ehternet port on your gateway and your computer's network card. Please refer to the accompanying Installation Guides for additional information.

2.1.1. LAN Connection with USB

Windows computers can be connected to the gateway via a USB port. This requires a download and installation of a USB driver.

1. Connect the Master end of the USB cable to the PC.

2. Connect the Slave end of the USB cable to the gateway. The 'Found New Hardware' dialog box will appear.

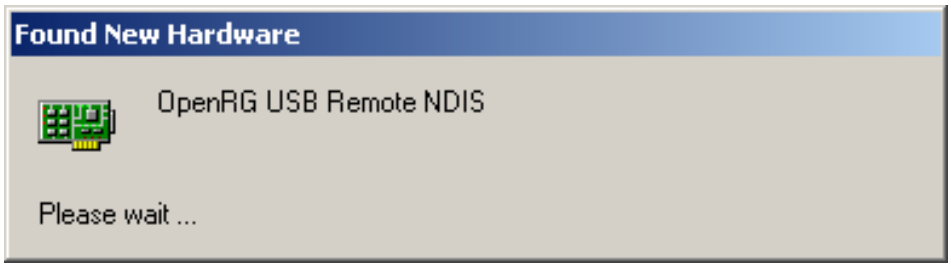

Figure 2.2. Found New Hardware

3. After the device detection process, you will be prompted to specify the location of the USB driver. Download the driver from http://www.jungo.com/openrg/download/openrg_usb_rndis.tgz , and specify its location.

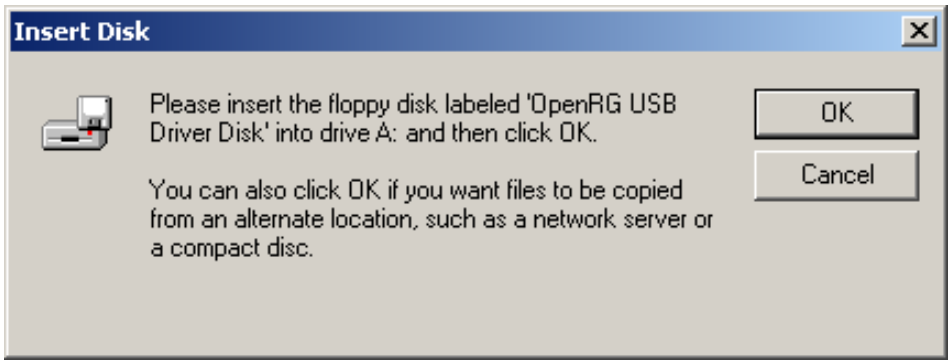
Insert Disk
Please insert the floppy disk labeled 'OpenRG USB Driver Disk' into drive A: and then click OK.
You can also click OK if you want files to be copied from an alternate location, such as a network server or a compact disc.
OK
Cancel

Figure 2.3. Insert Disk

4. Windows will automatically copy all of the files needed for networking and create a new USB network connection.

2.2. PC Network Configuration

Each network interface on the PC should either be configured with a statically defined IP address and DNS address, or should be instructed to automatically obtain an IP address using the Network DHCP server. OpenRG provides a DHCP server on its LAN and it is recommended to configure your LAN to obtain its IP and DNS server IPs automatically. This configuration principle is identical but performed differently on each operating system. Figure Figure 2.4 displays the 'TCP/IP Properties' dialog box as it appears in Windows XP. Following are TCP/IP configuration instructions for all supported operating systems.

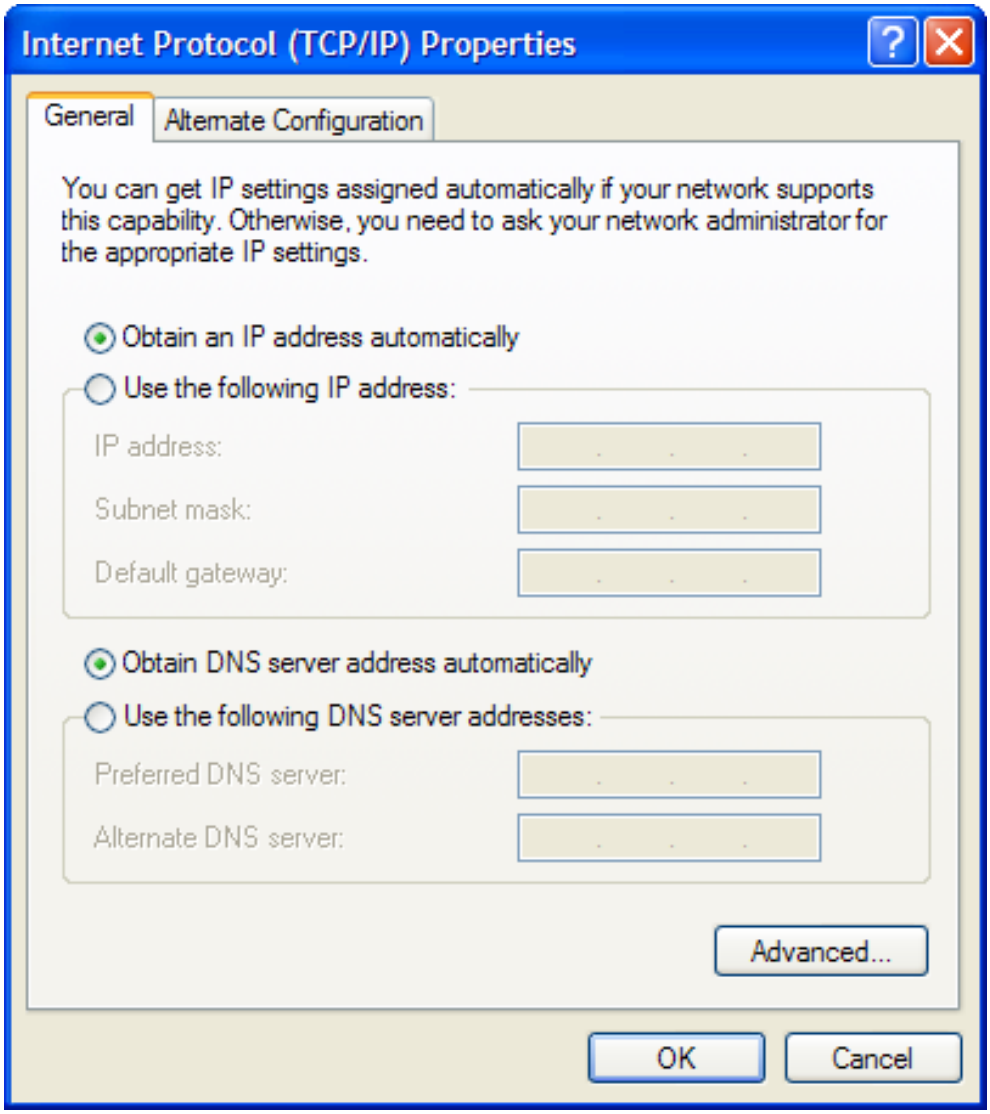
Internet Protocol (TCP/IP) Properties
General
Alternate Configuration
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
Subnet mask:
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Figure 2.4. IP and DNS Configuration

- **Windows XP**

  1. Access 'Network Connections' from the Control Panel.
  2. Right-click the Ethernet connection icon, and select 'Properties'.
  3. Under the 'General' tab, select the 'Internet Protocol (TCP/IP)' component, and press the 'Properties' button.
  4. The 'Internet Protocol (TCP/IP)' properties window will be displayed (see figure Figure 2.4).
     1. Select the 'Obtain an IP address automatically' radio button.
     2. Select the 'Obtain DNS server address automatically' radio button.
     3. Click 'OK' to save the settings.

- **Windows 2000/98/Me**

  1. Access 'Network and Dialing Connections' from the Control Panel.
  2. Right-click the Ethernet connection icon, and select 'Properties' to display the connection's properties.

3. Select the 'Internet Protocol (TCP/IP)' component, and press the 'Properties' button.
4. The 'Internet Protocol (TCP/IP)' properties will be displayed.
    1. Select the 'Obtain an IP address automatically' radio button.
    2. Select the 'Obtain DNS server address automatically' radio button.
    3. Click 'OK' to save the settings.

- **Windows NT**
    1. Access 'Network' from the Control Panel.
    2. From the 'Protocol' tab, select the 'Internet Protocol (TCP/IP)' component, and press the 'Properties' button.
    3. From the 'IP Address' tab select the 'Obtain an IP address automatically' radio button.
    4. From the 'DNS' tab, verify that no DNS server is defined in the 'DNS Service Search Order' box and no suffix is defined in the 'Domain Suffix Search Order' box.
- **Linux**
    1. Login into the system as a super-user, by entering "su" at the prompt.
    2. Type "ifconfig" to display the network devices and allocated IP addresses.
    3. Type "pump -i <dev>", where <dev> is the network device name.
    4. Type "ifconfig" again to view the new allocated IP address.
    5. Make sure no firewall is active on device <dev>.

Part II. Web-based Management

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3

Using the WBM

This chapter describes how to use OpenRG's Web-based management, which allows you to configure and control all of OpenRG's features and system parameters, using a user-friendly graphical interface. This user-friendly approach is also implemented in the WBM's documentation structure, which is based directly on the WBM's structure. You will find it easy to correspondingly navigate through both the WBM and its documentation.

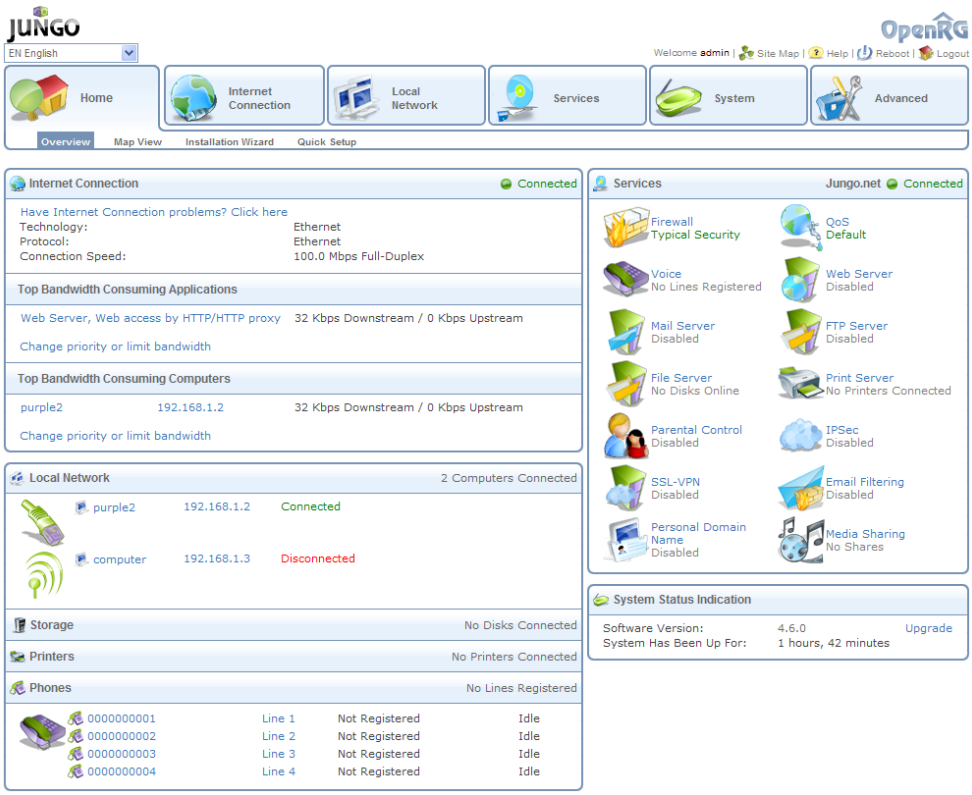


Figure 3.1. Web-based Management Home Page

3.1. Web Interception

Any initial attempt to surf the Internet from a computer connected to your gateway will be intercepted by OpenRG, which will display the installation wizard's 'Welcome to OpenRG' screen, along with an attention message:

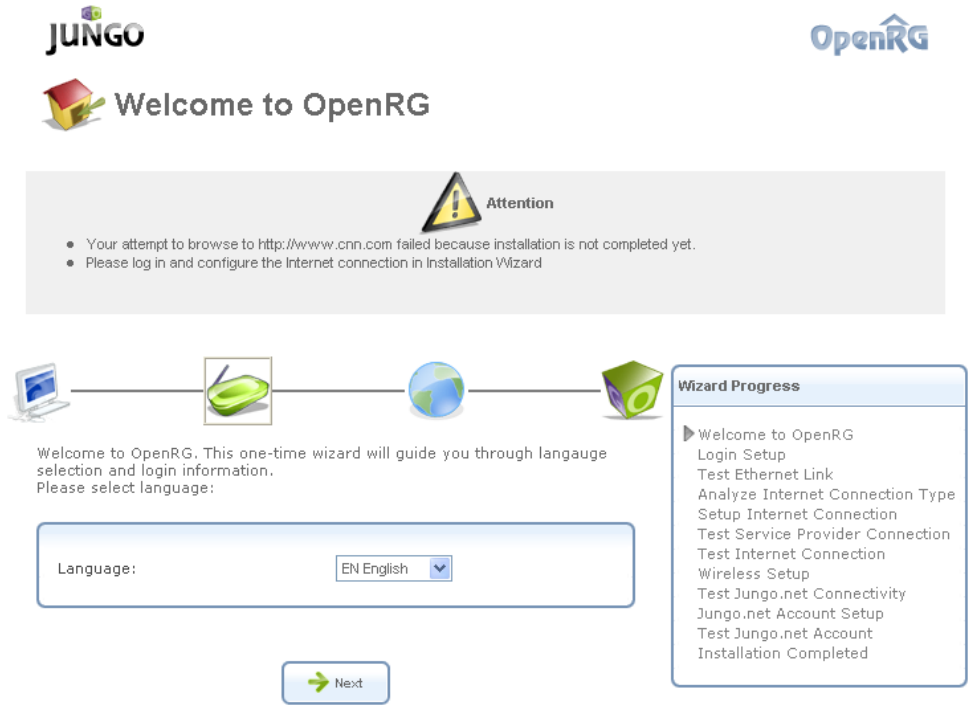


Figure 3.2. Web Interception Message

To gain Internet access, follow the first two steps of the wizard procedure. Once logged into the WBM, you can either continue the wizard to completion (refer to Section 4.3), or configure the 'Quick Setup' screen (refer to Section 4.4). In both cases surfing the Internet will be enabled, and the interception attention message will re-appear with a 'here' link that you can click in order to browse to your originally requested Internet address.

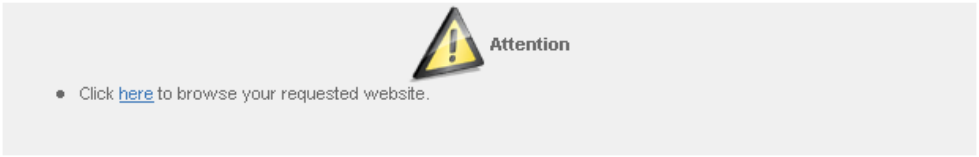


Figure 3.3. Attention

3.2. First Time Login

When logging into OpenRG for the first time, the installation wizard is the first screen to appear. This wizard is the first and foremost WBM configuration procedure.

1. Launch a Web browser on your computer.

2. Browse to *http://openrg.home*. The 'Welcome to OpenRG' screen appears (see Figure 3.4), enabling you to select the language for the management console.

Figure 3.4. Welcome to OpenRG

3. Select the desired language and click 'Next' to continue. The 'Login Setup' screen appears:

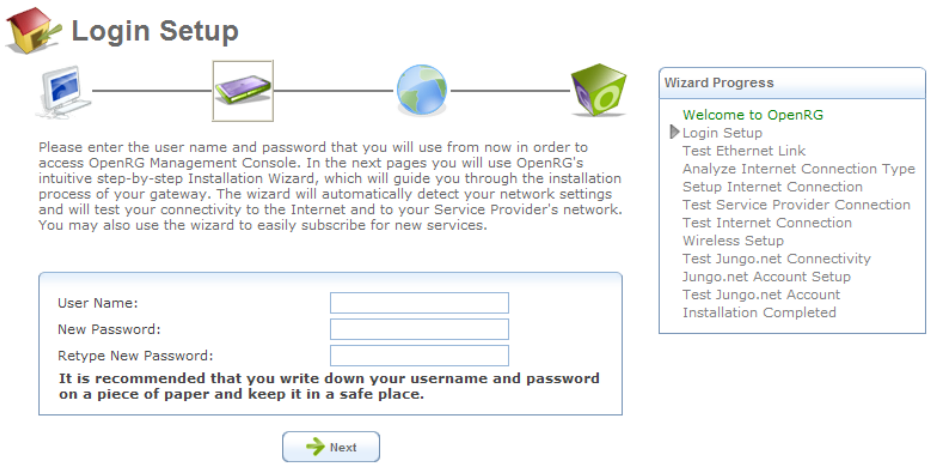

Login Setup
Wizard Progress
Welcome to OpenRG
Login Setup
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Wireless Setup
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed
Please enter the user name and password that you will use from now in order to access OpenRG Management Console. In the next pages you will use OpenRG's intuitive step-by-step Installation Wizard, which will guide you through the installation process of your gateway. The wizard will automatically detect your network settings and will test your connectivity to the Internet and to your Service Provider's network. You may also use the wizard to easily subscribe for new services.
User Name:
New Password:
Retype New Password:
It is recommended that you write down your username and password on a piece of paper and keep it in a safe place.
Next

Figure 3.5. WBM First Time Login

4. Enter a user name and password. Retype the password to verify its correctness. The default user name and password are both set to 'admin'. It is recommended to change these default values.

5. Click 'Next' to login. At this point you can either continue with the installation wizard procedure, or access the 'Quick Setup' screen in order to configure your Internet connection.

3.3. Accessing the WBM

To access the Web-based management:

1. Launch a Web browser on a computer in the LAN.

2. In the address bar, type the gateway's IP address or name as provided with your gateway. The default IP address is 192.168.1.1, and default name is 'http://openrg.home'.

3. Enter your username and password to log in to the WBM. For security reasons, you should change these settings after the initial login as explained in Chapter 2. The default user name is 'admin', and the default password is 'admin'.

Figure 3.6. WBM Login

Your session will automatically time-out after a few minutes of inactivity. If you try to operate the WBM after the session has expired, the 'Login' screen will appear and you will have to re-enter your user name and password before proceeding. This feature helps to prevent unauthorized users from accessing the WBM and changing the gateway's settings.

Note: If your computer is running an operating system that supports UPnP, such as Windows XP, you can easily add the computer to your home network and access the WBM directly from within Windows as explained in Section 8.7.1.

3.4. Navigational Aids

The Web-based management is a user-friendly interface, designed as an Internet Web site that can be explored with any Web browser. This section illustrates the WBM's page structure and describes its navigational components and their hierarchial manner.

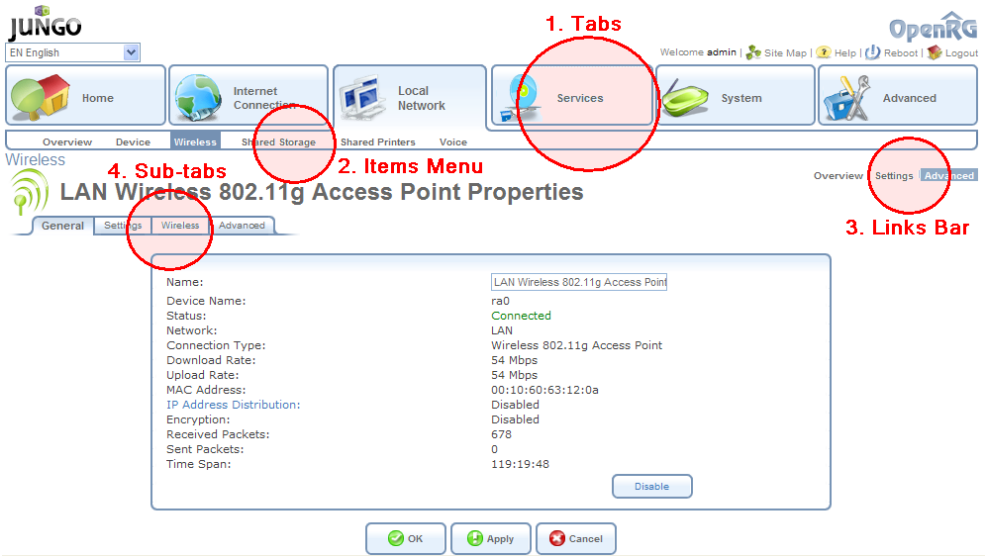


Figure 3.7. Navigation Components

1. The top level navigational aids are the ***Tabs***, grouping the WBM screens into several main subject areas.

2. Each tab has an ***Items Menu***, listing the different menu items relevant for the subject.

3. A menu item may have a ***Links Bar***, located at the top-right of the screen. These links further divide the menu item into different subjects.

4. Lastly, a page content, usually a feature's properties page, may have a set of ***Sub-tabs***, providing a division of settings in the form of yet another set of tabs.

Note: For convenience purposes, the entire WBM part of this User Manual has been constructed in accordance with the structure of the WBM—the chapter structure is identical to the tab structure, sections are written after item menus, etc.

In addition, a constant link bar appears at the top of every WBM page, providing shortcuts to information and control actions. These links include the site map, help, reboot and logout.

Figure 3.8. Constant Link Bar

3.5. Managing Tables

Tables are structures used throughout the Web-based management. They handle user-defined entries relating to elements such as network connections, local servers, restrictions and configurable parameters. The principles outlined in this section apply to all tables in the WBM.

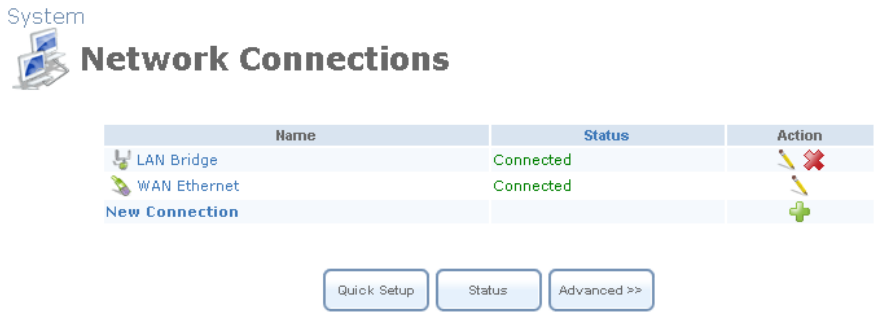


Figure 3.9. Typical Table Structure

Figure 3.9 illustrates a typical table. Each row defines an entry in the table. The following buttons, located in the 'Action' column, enable performing various actions on the table entries.

Use the **Add** action icon to add a row to the table.

Use the **Edit** action icon to edit a row in the table.

Use the **Remove** action icon to remove a row from the table.

Use the **Download** action icon to download a file from the table.

Use the **Copy** action icon to copy an item to the clipboard.

Use the **Move Up** action icon to move a row one step up in the table.

Use the **Move Down** action icon to move a row one step down in the table.

4

Home

4.1. Overview

The 'Overview' screen presents OpenRG's status summary in one convenient location. You can quickly and efficiently view important details of your connection status and hardware peripherals, as well as the statuses of OpenRG's different services. The following is the default 'Overview' screen.

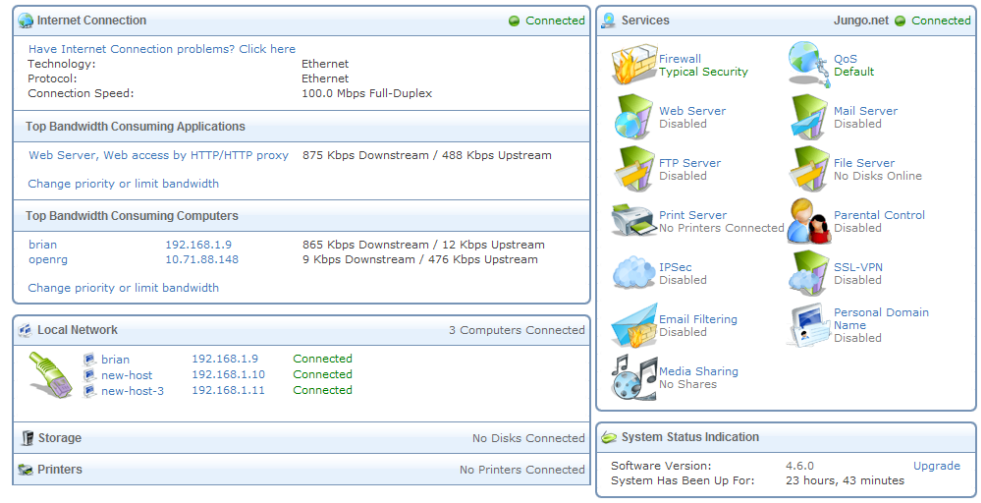


Figure 4.1. OpenRG Overview

Amongst its diverse information, OpenRG's homepage displays your Internet connection status, and specifically the top bandwidth consuming applications and computers.

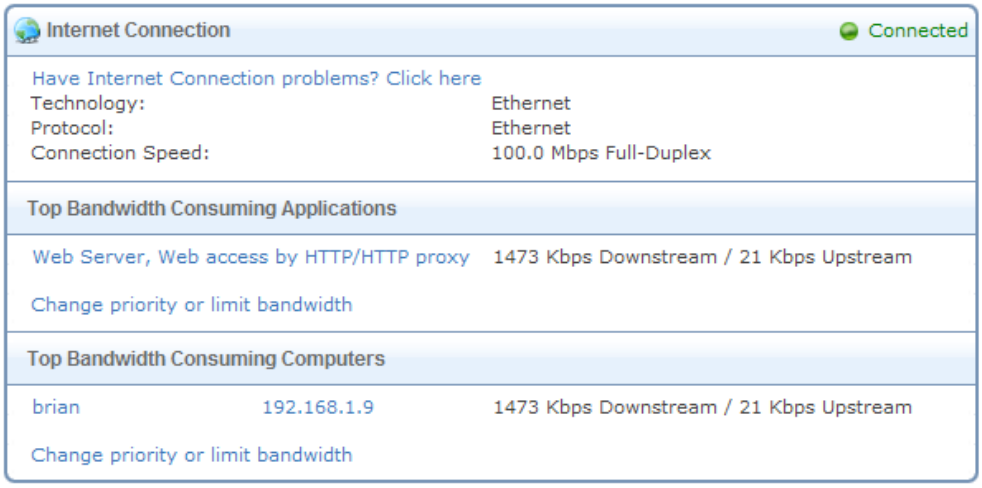

Internet Connection
Connected
Have Internet Connection problems? Click here
Technology: Ethernet
Protocol: Ethernet
Connection Speed: 100.0 Mbps Full-Duplex
Top Bandwidth Consuming Applications
Web Server, Web access by HTTP/HTTP proxy 1473 Kbps Downstream / 21 Kbps Upstream
Change priority or limit bandwidth
Top Bandwidth Consuming Computers
brian 192.168.1.9 1473 Kbps Downstream / 21 Kbps Upstream
Change priority or limit bandwidth

Figure 4.2. Internet Connection and Top Bandwidth Consumers

The top five bandwidth consuming applications and computers are displayed in their respective sections in descending order. The current downstream and upstream volumes are also displayed for every application and computer. The following links are available:

- **Have Internet Connection problems? Click here** This link routes you to the 'Diagnostics' screen under the 'Internet Connection' tab, where you can run tests in order to diagnose and resolve Internet connectivity problems (for more information, refer to section Section 5.4).

- **Top Bandwidth Consuming Applications** This headline link is identical to the 'Change priority or limit bandwidth' link inside this section. It routes to the 'Internet Connection Utilization' screen under 'QoS' in the 'Services' tab, and provides 'By Application' view. This section also displays the specific bandwidth consuming applications, which you can click to view their details (for more information, refer to section Section 7.4.2.1).

- **Top Bandwidth Consuming Computers** This headline link is identical to the 'Change priority or limit bandwidth' link inside this section. It routes to the 'Internet Connection Utilization' screen under 'QoS' in the 'Services' tab, and provides 'By Computer' view. This section also displays the specific bandwidth consuming computers, which you can click to view their details (for more information, refer to section Section 7.4.2.2).

OpenRG's homepage is not only informative but also functional, conveniently providing shortcuts to different features and their configurations. For example, if you connect an unformatted storage device to OpenRG, the screen's 'Storage' section changes to the following.

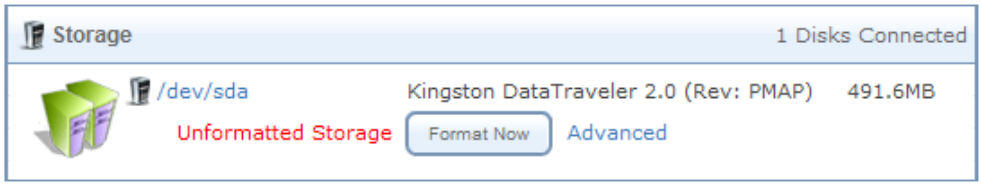


Figure 4.3. Unformatted Storage Device Message

By clicking the 'Format' button, OpenRG will format the disk in the default file system, which is FAT32. To format the disk in another file system, click the 'Advanced' link. This link leads to the 'Disk Information' screen located under 'Local Network'.

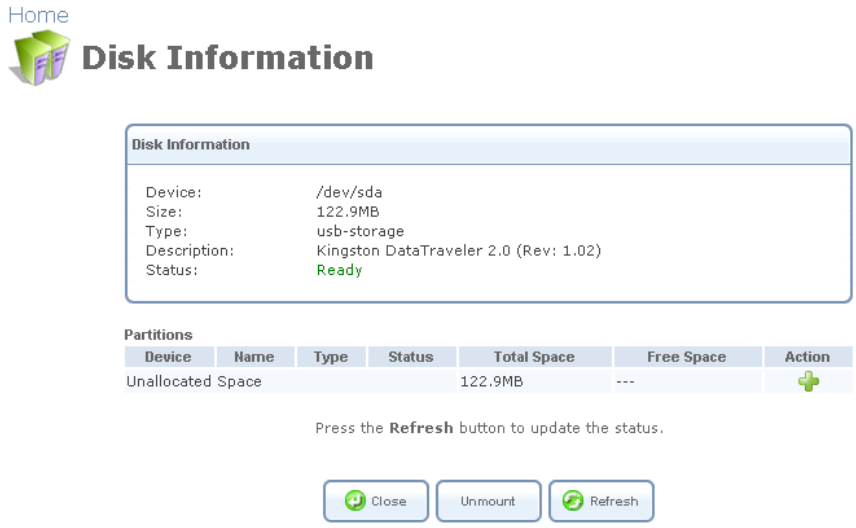


Figure 4.4. Disk Information

Click the action icon to start the disk configuration wizard. The next steps are described in detail in section Section 6.4.

4.2. Map View

The network map depicts the various network elements, such as the Internet connection, firewall, gateway, internal network interface (Ethernet, USB, Wireless, etc.) and local network computers and peripherals.

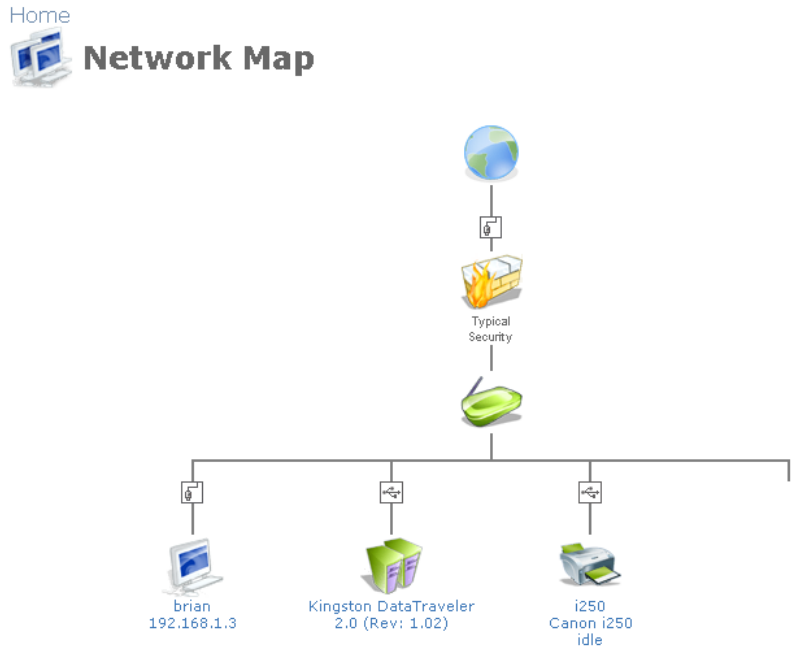


Figure 4.5. The Network Map

The following table explains the meaning of different network map symbols:

Represents the Internet

Represents your DSL Wide Area Network (WAN) connection. Click this icon to configure the WAN interface (refer to Section 8.4).

Represents your Ethernet Wide Area Network (WAN) connection. Click this icon to configure the WAN interface (refer to Section 8.4).

Represents the gateway's Firewall. The height of the wall corresponds to the security level currently selected: Minimum, Typical or Maximum. Click this icon to configure security settings (refer to Section 7.3).

If OpenRG is equipped with multiple LAN devices (other than bridges), the network map will display the following icons to indicate the interfaces used for connecting these devices.

Represents an Ethernet Local Area Network (LAN) connection. Click this icon to configure network parameters for the Ethernet LAN device (refer to Section 8.4).

Represents a USB LAN connection. Click this icon to configure network parameters for the USB LAN device (refer to Section 8.4).

Represents a Wireless LAN connection. Click this icon to configure network parameters for the Wireless LAN device (refer to Section 8.4).

Represents a bridge connected in the home network. Click this icon to view the bridge's underlying devices.

Represents a computer (host) connected in the home network. Each computer connected to the network appears below the network symbol of the network through which it is connected. Click an icon to view network information for the corresponding computer.

Represents a printer that is connected to OpenRG and is shared by network users. Click the icon to view the printer's settings.

Represents a file server that is connected to OpenRG and is shared by network users. Click the icon to view the file server configuration.

OpenRG's standard network map displays devices that OpenRG recognized and granted a DHCP lease. However, with OpenRG's optional Zero Configuration Technology feature, devices with statically-defined IP addresses will also be recognized and displayed. For more information regarding this option, refer to Chapter 10.

4.3. Installation Wizard

As explained in its first screen, the installation wizard is a step-by-step procedure that guides you through your Internet connection and wireless network setup, and helps you to subscribe for different services. The wizard

progress box, located at the right hand side of the screen, provides a monitoring tool for the wizard's steps during the installation progress.

Home
Installation Wizard
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Wireless Setup
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed
Welcome to OpenRG's step-by-step Installation Wizard. This wizard will guide you through your Internet connection and wireless network setup, and will help you to subscribe for services that are available to you as an OpenRG user. Please note that using the step-by-step installation wizard will override your existing gateway configuration.
To continue, click Next.
Next
Exit

Figure 4.6. Installation Wizard

To start the installation wizard, click Next. The wizard procedure will commence, performing the steps listed in the progress box consecutively, stopping only if a step fails or if input is required. The following sections describe the wizard steps along with their success/failure scenarios. If a step fails, use the Retry or Skip buttons to continue.

4.3.1. Step 1: Test Ethernet Link

The first step is a test of the Ethernet connection. This step may fail if OpenRG cannot detect your Ethernet link (for example, if the cable is unplugged).

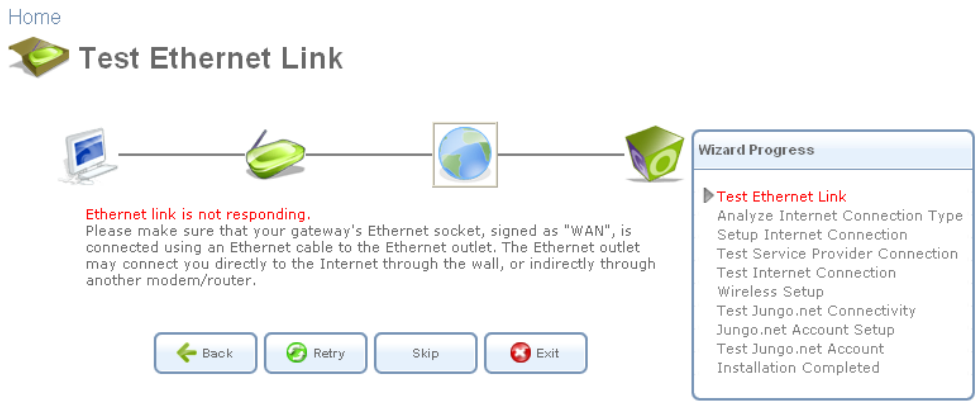

Home
Test Ethernet Link
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Wireless Setup
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed
Ethernet link is not responding.
Please make sure that your gateway's Ethernet socket, signed as "WAN", is connected using an Ethernet cable to the Ethernet outlet. The Ethernet outlet may connect you directly to the Internet through the wall, or indirectly through another modem/router.
Back
Retry
Skip
Exit

Figure 4.7. Test Ethernet Link

Verify that your Ethernet cables are connected properly, and click Retry.

4.3.2. Step 2: Analyze Internet Connection Type

The next step is an analysis of your Internet connection.

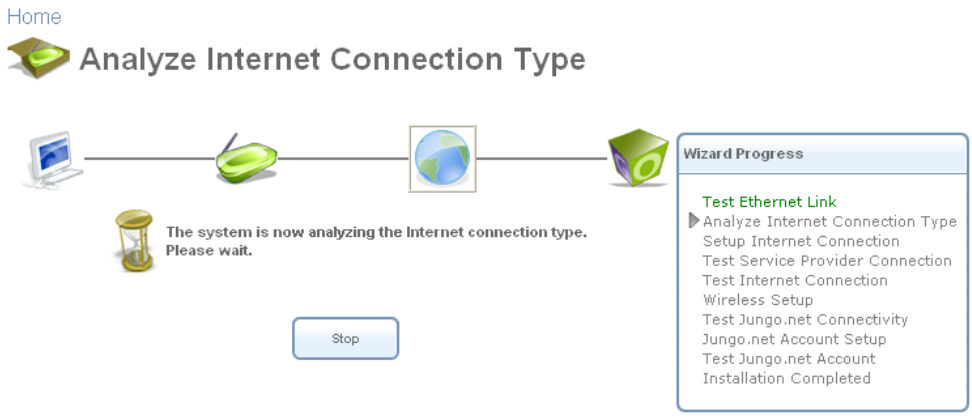


Figure 4.8. Analyze Internet Connection Type

This step may fail if OpenRG is unable to detect your Internet connection type.

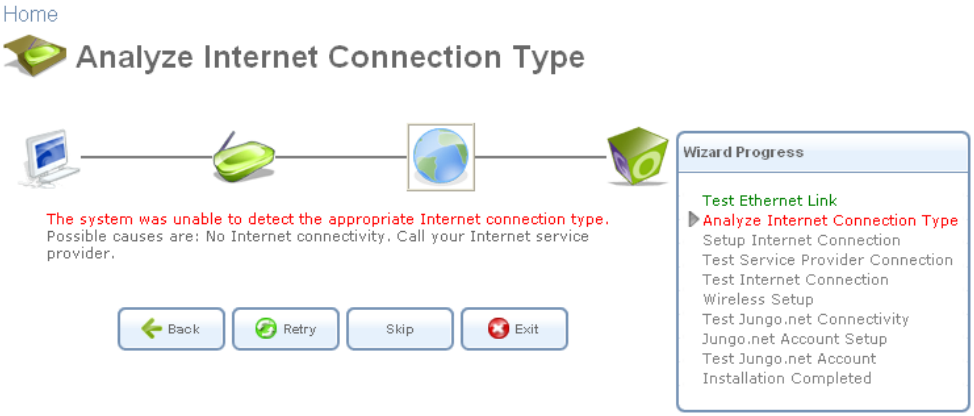


Figure 4.9. Analyze Internet Connection Type -- Failure

After three retries, the screen provides a link to manually set the Internet connection type:

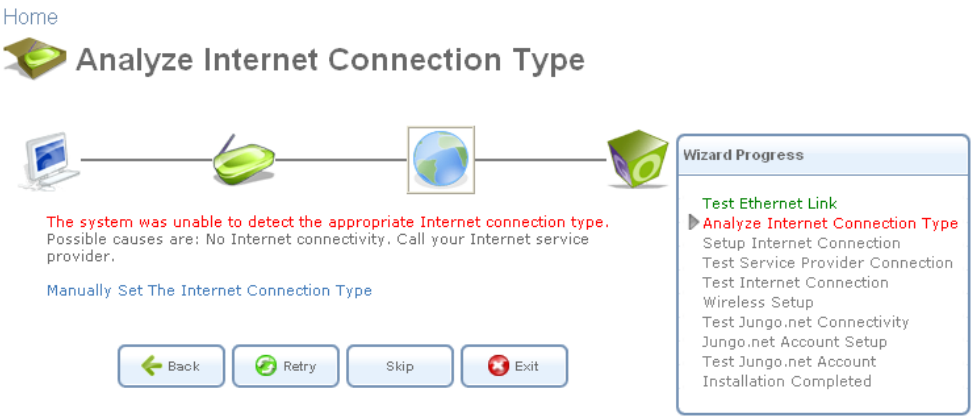


Figure 4.10. Analyze Internet Connection Type -- Manual Set

Click this link. The screen refreshes, displaying a connection type combo box:

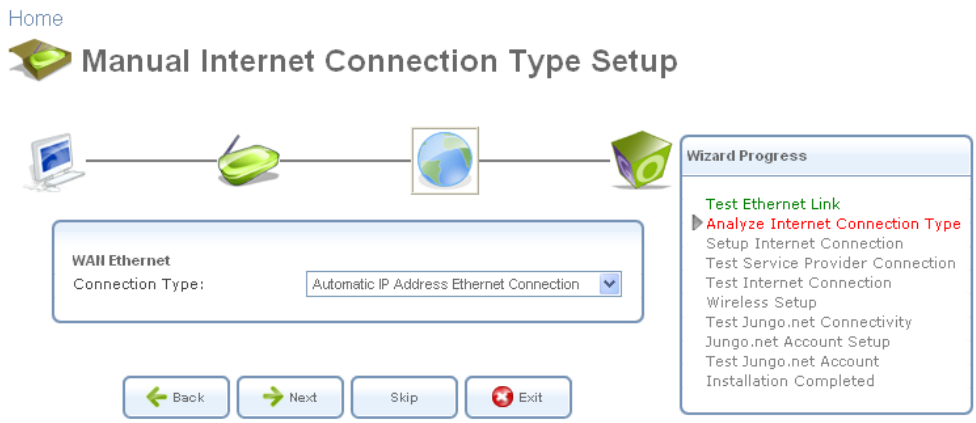


Figure 4.11. Manual Internet Connection Type Setup

To learn about manually configuring your Internet connection, please refer to section Section 4.4.1 .

4.3.3. Step 3: Setup Internet Connection

If your Internet connection requires login details provided by your Internet Service Provider (ISP) (e.g when using PPPoE), the following screen appears:

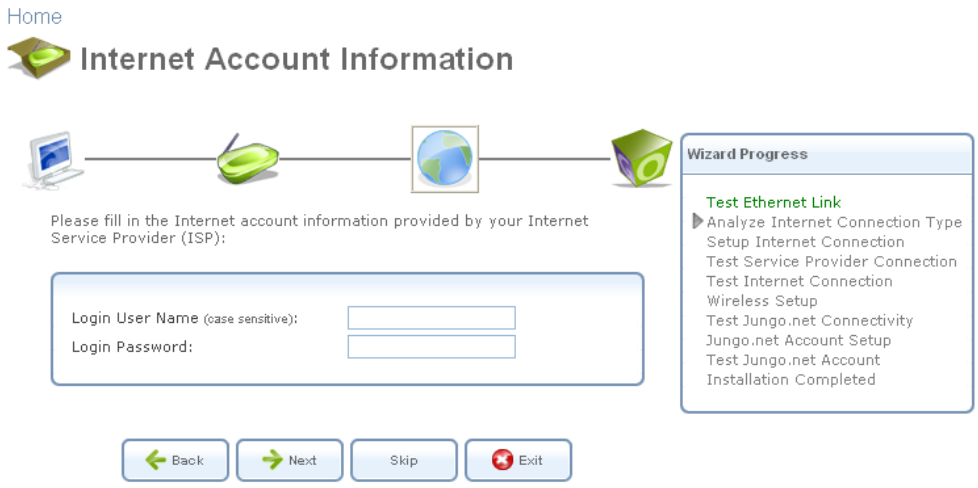


Figure 4.12. Internet Account Information

Enter your user name and password and click Next. Failure to enter the correct details yields the following message. Click Back and try again.

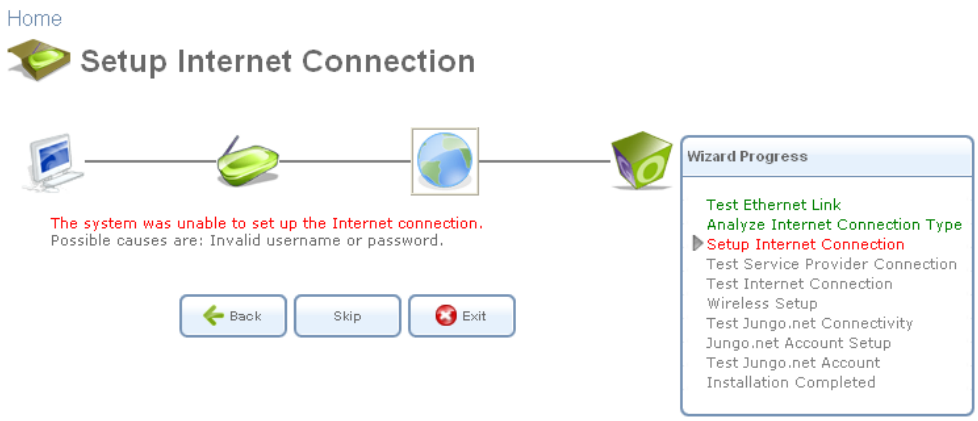


Figure 4.13. Setup Internet Connection

4.3.4. Step 4: Test Service Provider Connection

This step tests the connectivity to your ISP.

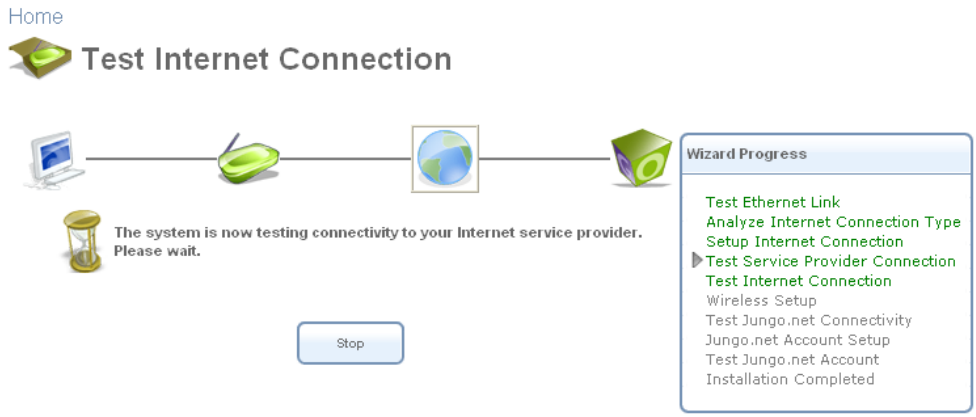


Figure 4.14. Test Internet Connection

4.3.5. Step 5: Test Internet Connection

This step tests the connectivity to the Internet.

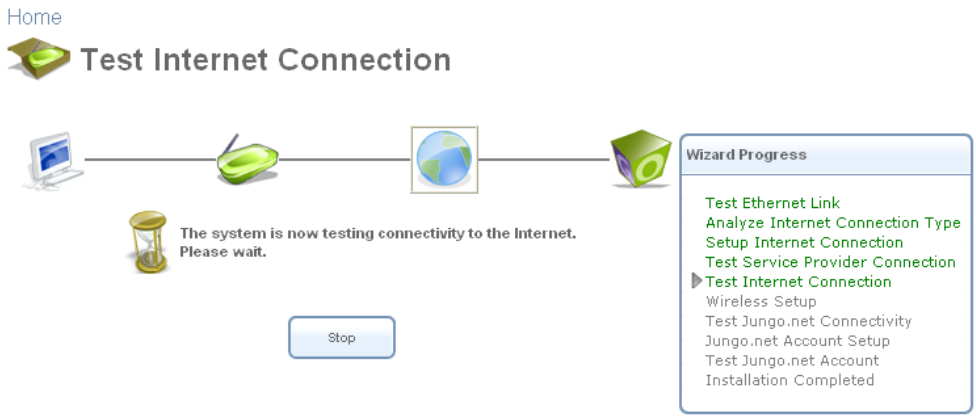


Figure 4.15. Test Internet Connection

4.3.6. Step 6: Wireless Setup

Use this step to configure a wireless network. Enter a name for your wireless network and select its level of security. Click Next.

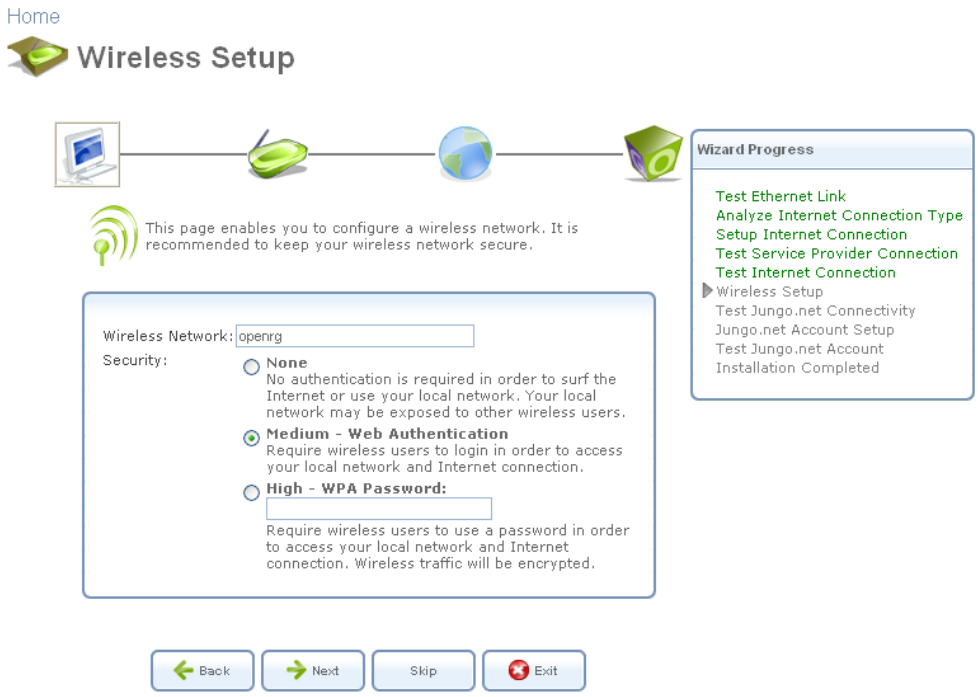

Home
Wireless Setup
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Wireless Setup
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed
This page enables you to configure a wireless network. It is recommended to keep your wireless network secure.
Wireless Network: openrg
Security:
None
No authentication is required in order to surf the Internet or use your local network. Your local network may be exposed to other wireless users.
Medium - Web Authentication
Require wireless users to login in order to access your local network and Internet connection.
High - WPA Password:
Require wireless users to use a password in order to access your local network and Internet connection. Wireless traffic will be encrypted.
Back
Next
Skip
Exit

Figure 4.16. Wireless Setup

4.3.7. Step 7: Test Jungo.net Connectivity

This step tests connectivity to the Jungo.net server.

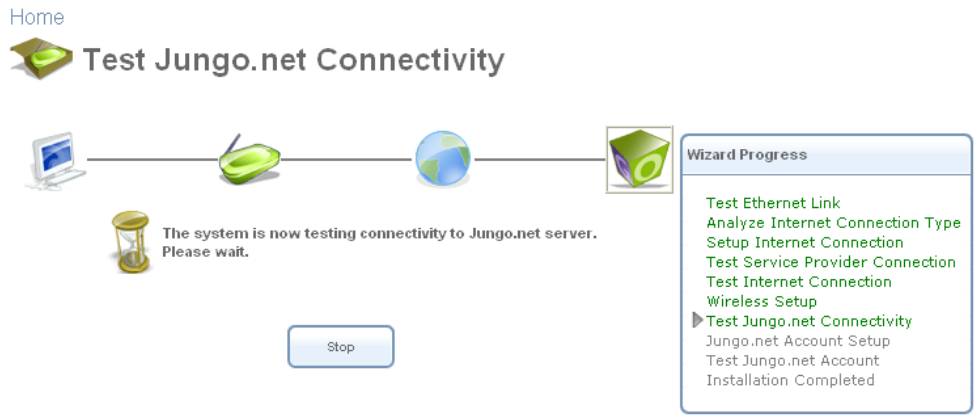


Figure 4.17. Test Jungo.net Connectivity

4.3.8. Step 8: Jungo.net Account Setup

This step tests the Jungo.net account supplied by your service provider.

Figure 4.18. Jungo.net Account Setup

If you do not have a Jungo.net account yet, the following screen appears, enabling you to create one.

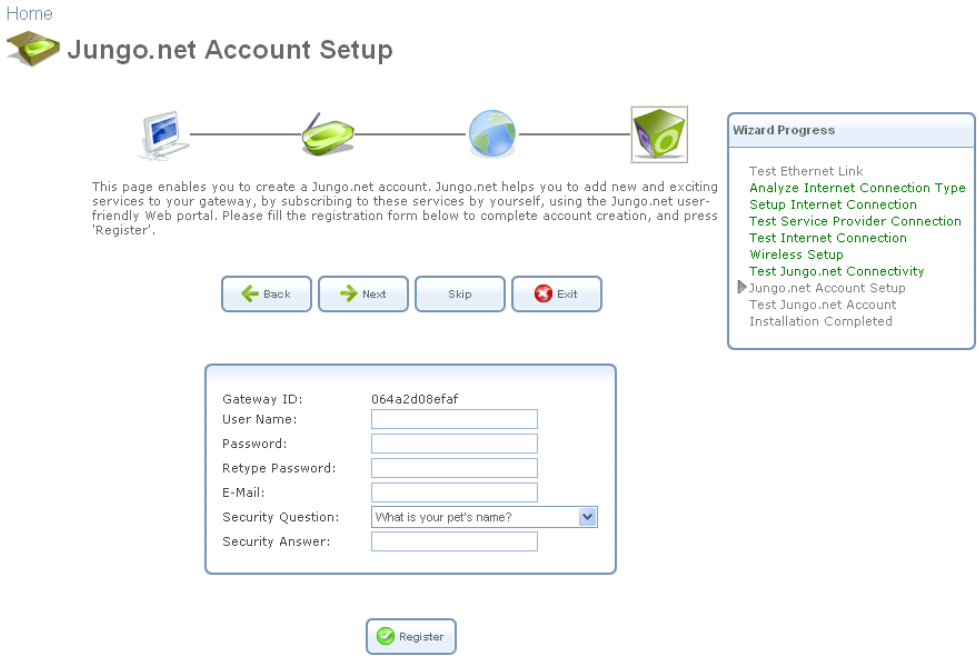


Figure 4.19. Jungo.net Account Setup -- Creating an Account

Fill in the following fields:

User Name The login name used for entering Jungo.net.

Password The password used for entering Jungo.net.

Confirm Password Retype the password for confirmation.

E-Mail Your email address.

Security Question A question asked to verify your identity.

Security Answer An answer you create for the security question.
To create the account, click 'Register'. The gateway is configured with your Jungo.net account settings.

Home
Jungo.net Account Setup
This page enables you to create a Jungo.net account. Jungo.net helps you to add new and exciting services to your gateway, by subscribing to these services by yourself, using the Jungo.net user-friendly Web portal. Please fill the registration form below to complete account creation, and press Register.
Back
Next
Skip
Exit
Configuring the gateway. Please wait...
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Wireless Setup
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed

Figure 4.20. Configuring OpenRG with the Jungo.net Account

When the gateway is configured successfully, the following screen appears.

Home
Jungo.net Account Setup
This page enables you to create a Jungo.net account. Jungo.net helps you to add new and exciting services to your gateway, by subscribing to these services by yourself, using the Jungo.net user-friendly Web portal. Please fill the registration form below to complete account creation, and press Register.
Back
Next
Skip
Exit
Operation completed successfully
OK
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Wireless Setup
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed

Figure 4.21. Successful Gateway Configuration

Click 'OK'. The wizard proceeds to detect Jungo.net services supported by the gateway, and displays the following screen.

Home
Jungo.net Account Setup
This page enables you to create a Jungo.net account. Jungo.net helps you to add new and exciting services to your gateway, by subscribing to these services by yourself, using the Jungo.net user-friendly Web portal. Please fill the registration form below to complete account creation, and press 'Register'.
Back
Next
Skip
Exit
Jungo.net server detecting services supported by your Gateway. Please wait...
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Wireless Setup
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed

Figure 4.22. Detecting Jungo.net Services

Note: The detection of services may fail, if the Internet traffic is overloaded. In this case, return to the installation wizard later.

If your gateway supports the NationZone service (refer to Section 7.2.3.5), the following screen appears, offering you to enable the service on your gateway.

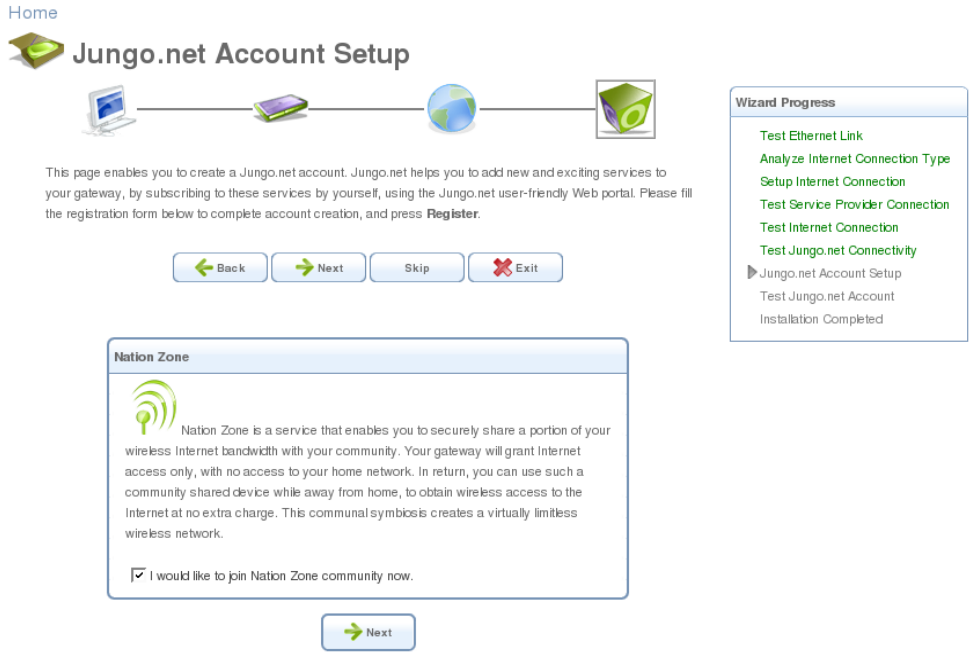

Home
Jungo.net Account Setup
This page enables you to create a Jungo.net account. Jungo.net helps you to add new and exciting services to your gateway, by subscribing to these services by yourself, using the Jungo.net user-friendly Web portal. Please fill the registration form below to complete account creation, and press Register.
Back
Next
Skip
Exit
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed
Nation Zone
Nation Zone is a service that enables you to securely share a portion of your wireless Internet bandwidth with your community. Your gateway will grant Internet access only, with no access to your home network. In return, you can use such a community shared device while away from home, to obtain wireless access to the Internet at no extra charge. This communal symbiosis creates a virtually limitless wireless network.
I would like to join Nation Zone community now.
Next

Figure 4.23. Enable NationZone

When all supported services are detected, the gateway is automatically configured with the obtained service settings. At this step, the following screen appears.

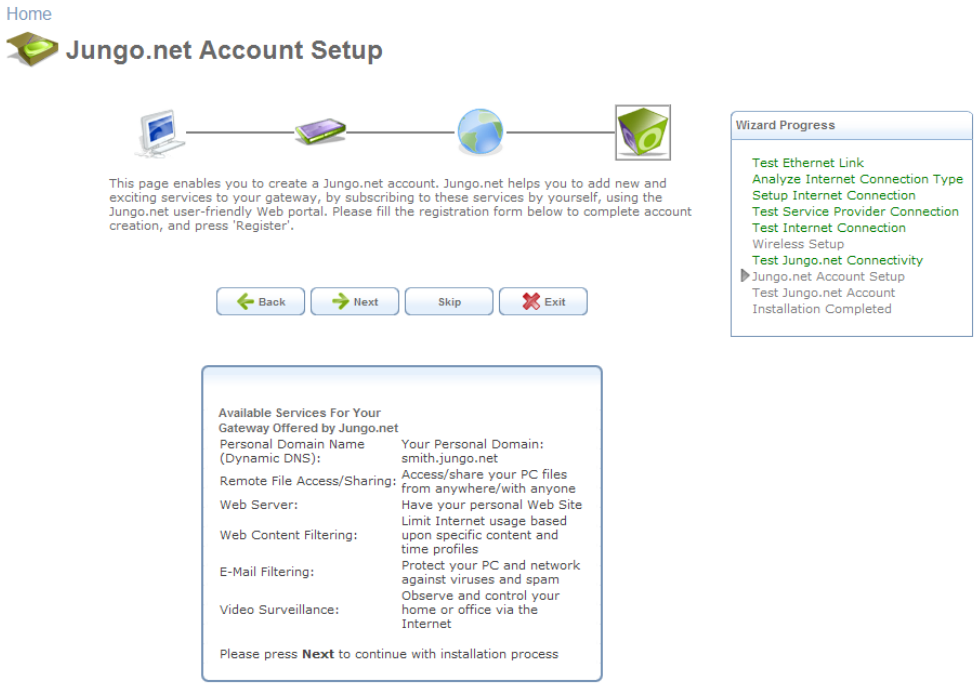

Home
Jungo.net Account Setup
This page enables you to create a Jungo.net account. Jungo.net helps you to add new and exciting services to your gateway, by subscribing to these services by yourself, using the Jungo.net user-friendly Web portal. Please fill the registration form below to complete account creation, and press 'Register'.
Back
Next
Skip
Exit
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Wireless Setup
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed
Available Services For Your Gateway Offered by Jungo.net
Personal Domain Name (Dynamic DNS): Your Personal Domain: smith.jungo.net
Remote File Access/Sharing: Access/share your PC files from anywhere/with anyone
Web Server: Have your personal Web Site
Web Content Filtering: Limit Internet usage based upon specific content and time profiles
E-Mail Filtering: Protect your PC and network against viruses and spam
Video Surveillance: Observe and control your home or office via the Internet
Please press Next to continue with installation process

Figure 4.24. Available Jungo.net Services

Click 'Next' to proceed to the Jungo.net account validation step.

4.3.9. Step 9: Test Jungo.net Account

This step validates your account on the Jungo.net server.

Figure 4.25. Test Jungo.net Account

4.3.10. Step 10: Installation Completed

This screen provides a summary of all the above Internet connection configuration steps and their results. Click Finish to complete the wizard procedure.

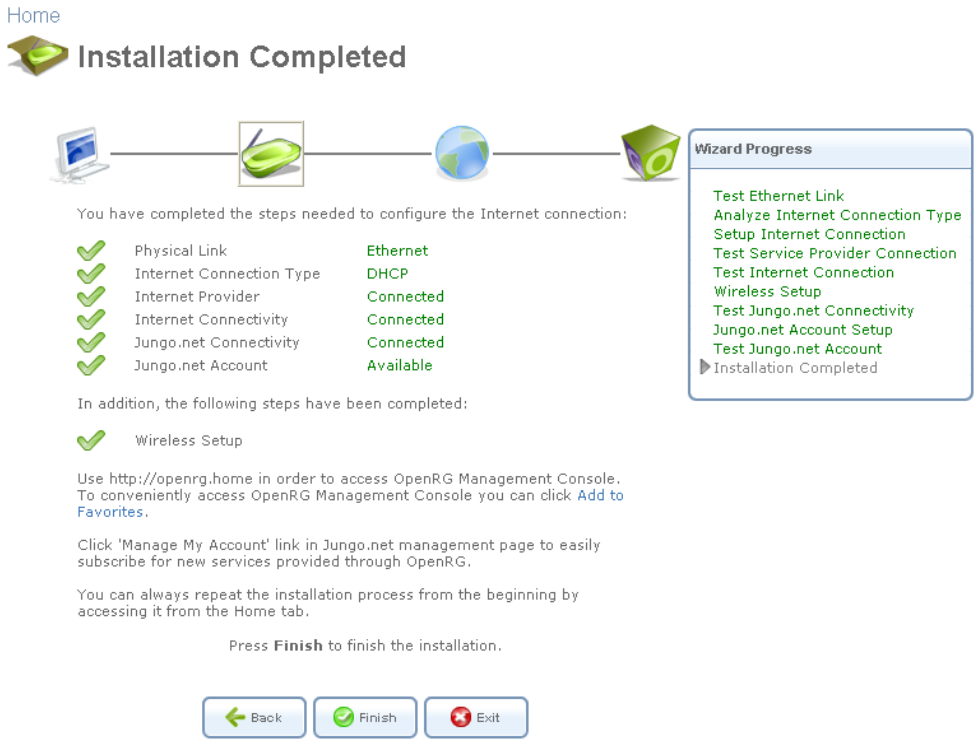

Home
Installation Completed
You have completed the steps needed to configure the Internet connection:
Physical Link Ethernet
Internet Connection Type DHCP
Internet Provider Connected
Internet Connectivity Connected
Jungo.net Connectivity Connected
Jungo.net Account Available
In addition, the following steps have been completed:
Wireless Setup
Use http://openrg.home in order to access OpenRG Management Console.
To conveniently access OpenRG Management Console you can click Add to Favorites.
Click 'Manage My Account' link in Jungo.net management page to easily subscribe for new services provided through OpenRG.
You can always repeat the installation process from the beginning by accessing it from the Home tab.
Press Finish to finish the installation.
Back
Finish
Exit
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Wireless Setup
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed

Figure 4.26. Installation Completed

4.4. Quick Setup

'Quick Setup' enables speedy and accurate configuration of your Internet connection and other important parameters. The following sections describe these various configuration parameters. Whether you configure these parameters or use the default ones, click 'OK' to enable your Internet connection.

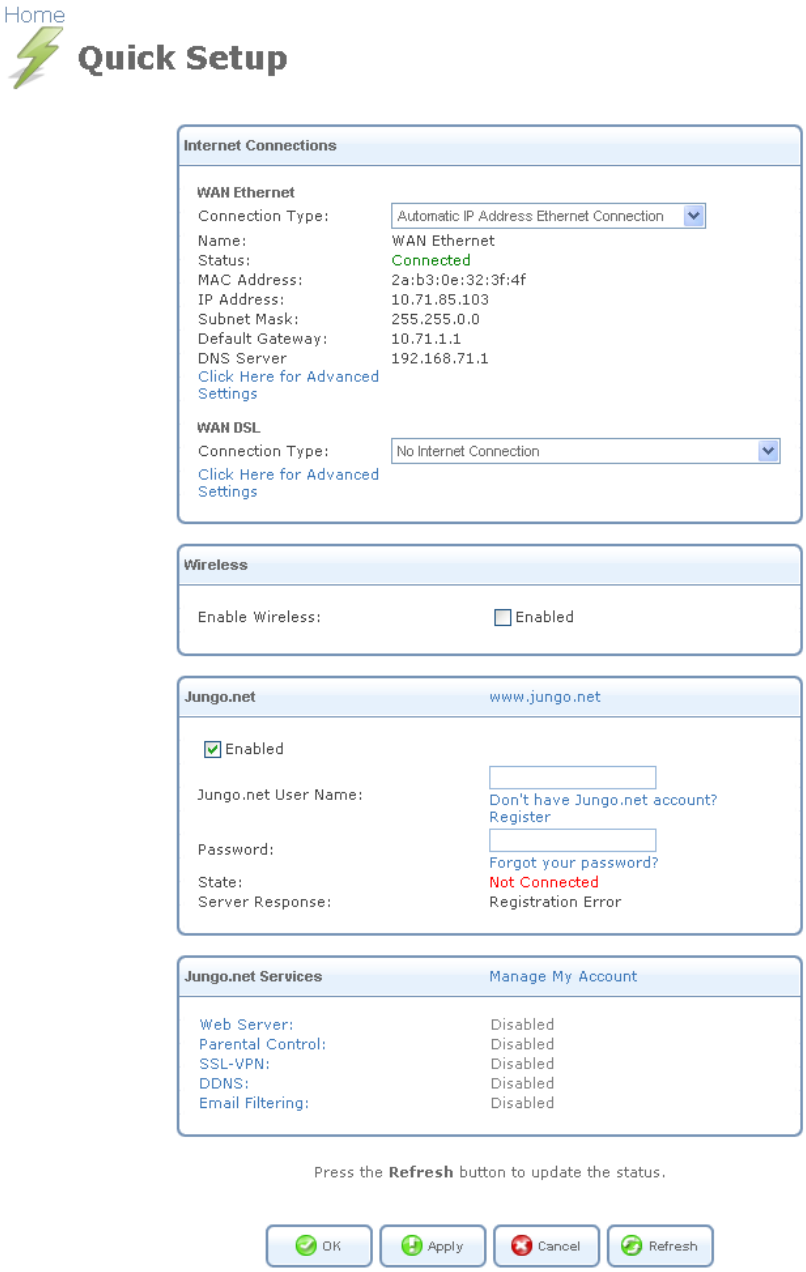


Figure 4.27. Quick Setup

4.4.1. Configuring Your Internet Connection

When subscribing to a broadband service, you should be aware of the method by which you are connected to the Internet. Your physical WAN device can be either Ethernet, DSL, or both. Technical information regarding the properties of your Internet connection should be provided by your Internet Service Provider (ISP). For example, your ISP should inform you whether you are connected to the Internet using a static or dynamic IP address, or what protocols, such as PPTP or PPPoE, you will be using to communicate over the Internet. OpenRG will

automatically recognize if you have more than one physical WAN device on your gateway, and will provide a configuration section for each, under the 'Internet Connections' section of the 'Quick Setup' screen:

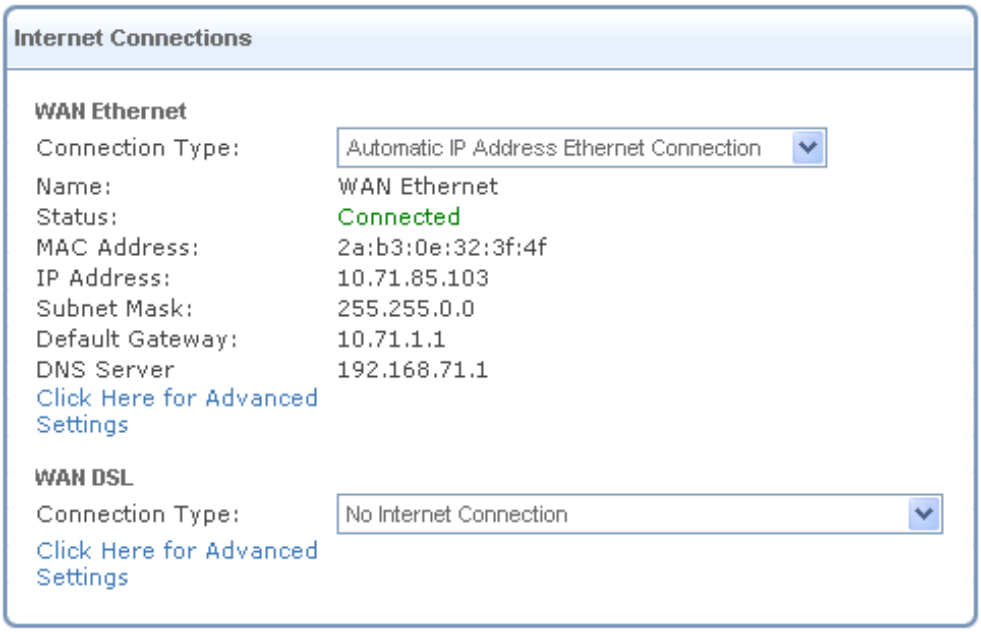


Figure 4.28. Quick Setup - Multiple WAN Devices

Your WAN connection(s) can be configured using one of the following methods. Read the configuration instructions relevant to you, by selecting your connection method from the following list:

- Ethernet device:
  - Manual IP Address Ethernet Connection [Section 4.4.1.1]
  - Automatic IP Address Ethernet Connection [Section 4.4.1.2]
  - Point-to-Point Tunneling Protocol (PPTP) [Section 4.4.1.3]
  - Layer 2 Tunneling Protocol (L2TP) [Section 4.4.1.4]
- DSL device:
  - Point-to-point protocol over ATM (PPPoA) [Section 4.4.1.5]
  - Routed Ethernet Connection over ATM (ETHoA) [Section 4.4.1.6]
  - Bridged Ethernet Connection over ATM (ETHoA) [Section 4.4.1.7]
  - Classical IP over ATM (CLIP) [Section 4.4.1.8]
- Common to both:
  - Point-to-point protocol over Ethernet (PPPoE) [Section 4.4.1.9]
  - No Internet connection [Section 4.4.1.10]

4.4.1.1. Manual IP Address Ethernet Connection

1. Select 'Manual IP Address Ethernet Connection' from the 'Connection Type' combo box:

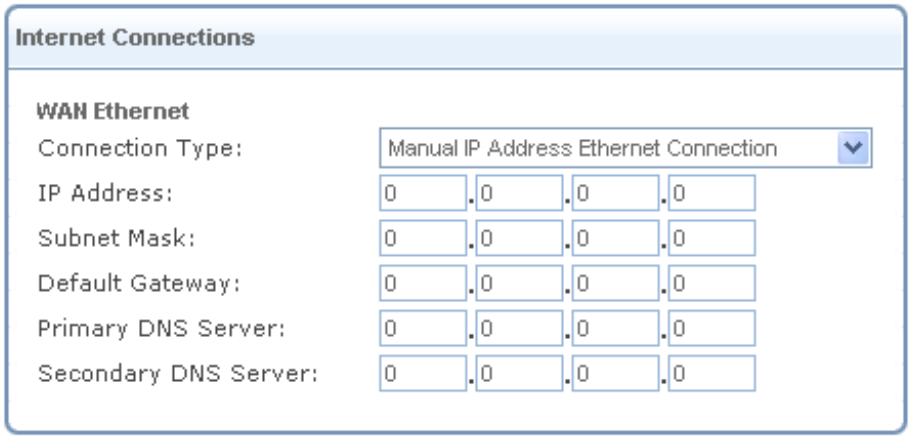


Figure 4.29. Internet Connection - Manual IP Address Ethernet Connection

2. According to your service provider's instructions, specify the following parameters:

   - IP address
   - Subnet mask
   - Default gateway
   - Primary DNS server
   - Secondary DNS server

4.4.1.2. Automatic IP Address Ethernet Connection

Select 'Automatic IP Address Ethernet Connection' from the 'Connection Type' combo-box (see figure Figure 4.30). OpenRG will obtain the WAN IP and DNS IP addresses from a DHCP server on the WAN.

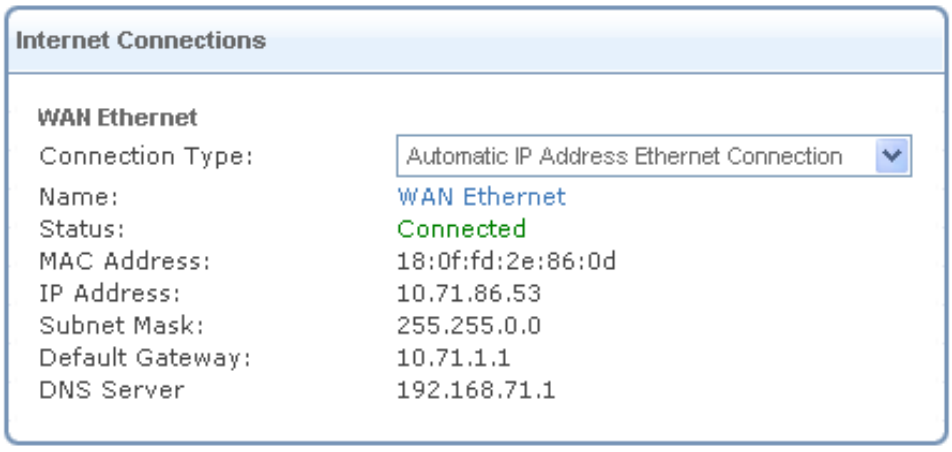


Figure 4.30. Internet Connection - Automatic IP Address Ethernet Connection

4.4.1.3. Point-to-Point Tunneling Protocol (PPTP)

1. Select 'Point-to-Point Tunneling Protocol (PPTP)' from the 'Connection Type' combo box:

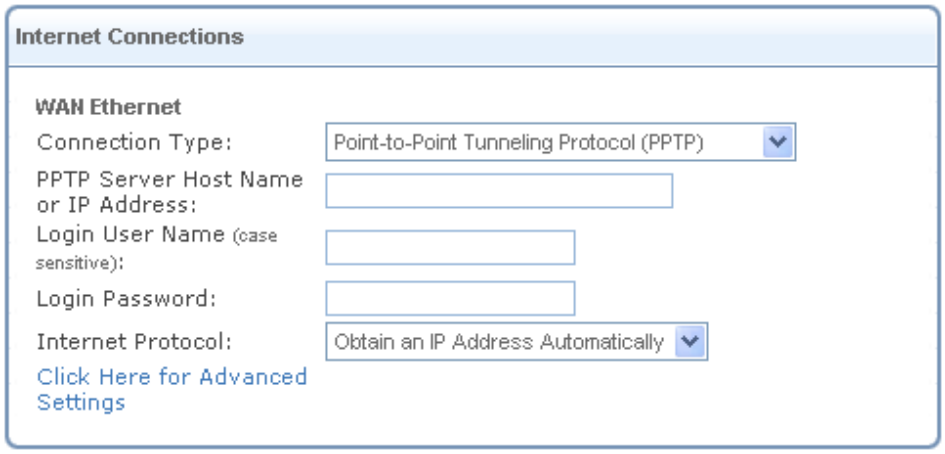


Figure 4.31. Internet Connection - PPTP

2. Configure the following parameters according to your ISP information:

   - PPTP Server Host Name or IP Address
   - Login User Name
   - Login Password
   - Select the Internet Protocol: Most Internet Service Providers (ISPs) provide dynamic IP addresses, hence the default "Obtain an IP Address Automatically". Should this not be the case, select the "Use the Following IP Address" option. The screen refreshes. Enter the IP Address, Subnet Mask, and Default Gateway provided to you by your ISP.

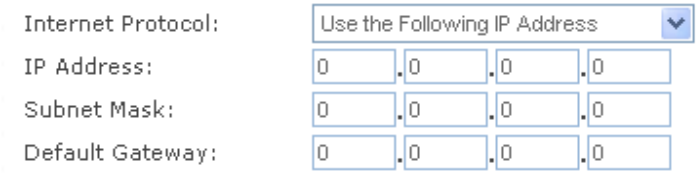


Figure 4.32. PPTP - Static IP Address

4.4.1.4. Layer 2 Tunneling Protocol (L2TP)

1. Select 'Layer 2 Tunneling Protocol (L2TP)' from the 'Connection Type' combo box:

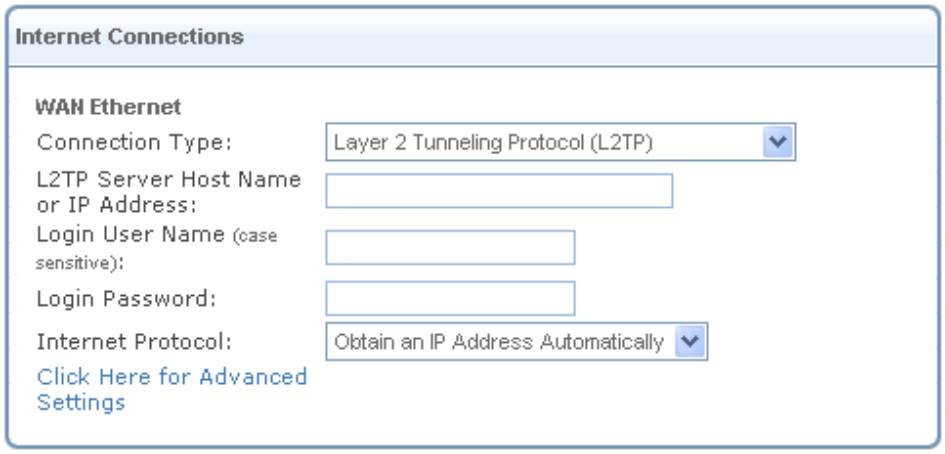


Figure 4.33. Internet Connection - L2TP

2. Configure the following parameters according to your ISP information:

   - L2TP Server Host Name or IP Address
   - Login User Name
   - Login Password
   - Select the Internet Protocol: Most Internet Service Providers (ISPs) provide dynamic IP addresses, hence the default "Obtain an IP Address Automatically". Should this not be the case, select the "Use the Following IP Address" option. The screen refreshes. Enter the IP Address, Subnet Mask, and Default Gateway provided to you by your ISP.

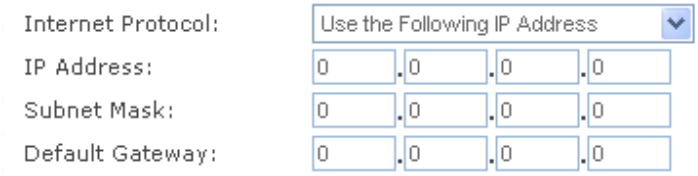


Figure 4.34. L2TP - Static IP Address

4.4.1.5. Point-to-point protocol over ATM (PPPoA)

1. Select 'Point-to-point protocol over ATM (PPPoA)' from the 'Connection Type' combo box:

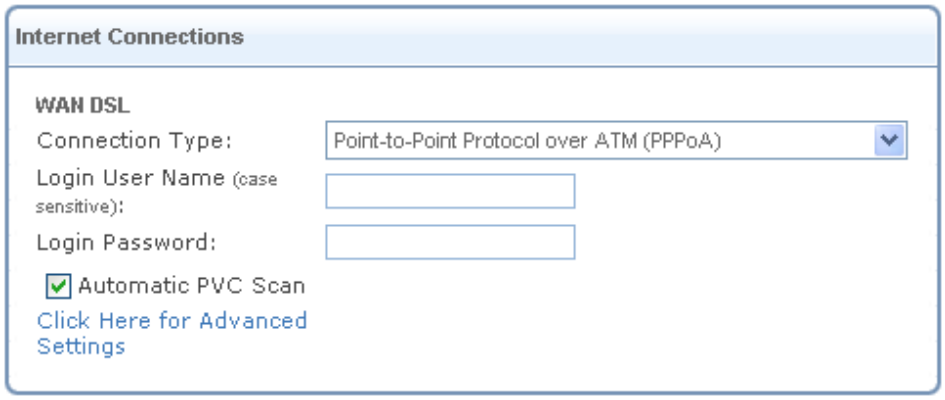


Figure 4.35. Internet Connection - PPPoA

2. Your Internet Service Provider (ISP) should provide you with the following information:
   - Login user name
   - Login password
   - By default, the 'Automatic PVC Scan' check box is enabled, which means that OpenRG configures the VPI, VCI and encapsulation parameters automatically. If you would like to configure these parameters manually, uncheck this check box. The screen refreshes:

Figure 4.36. Manual PVC Scan Parameters

   - Specify the VPI and VCI values.
   - Select the encapsulation method from the combo box. You can choose among the following methods:
     - LLC
     - VCMux
     - VCMux - HDLC

4.4.1.6. Routed Ethernet Connection over ATM (ETHoA)

1. Select 'Routed Ethernet Connection over ATM (ETHoA)' from the 'Connection Type' combo box:

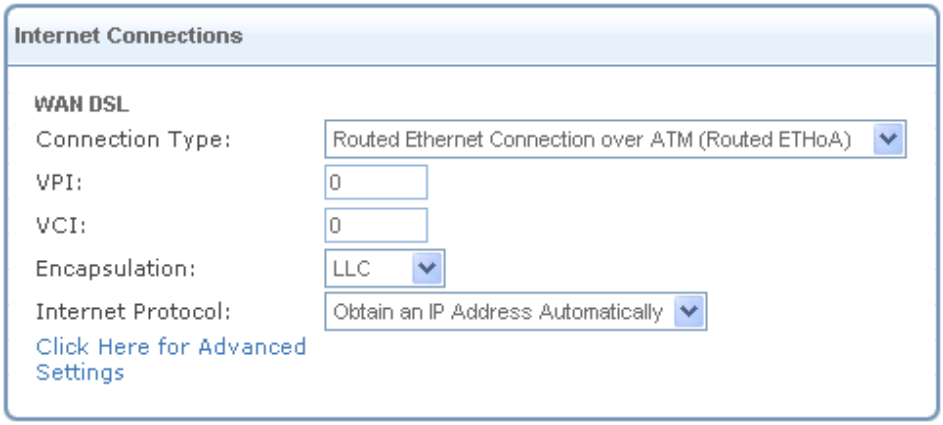


Figure 4.37. Internet Connection - Routed ETHoA

2. Your Internet Service Provider (ISP) should provide you with the following information:
   - Specify the value of the VPI and VCI parameters.
   - Select the encapsulation method from the combo box. You can choose among the following methods:
     - LLC
     - VCMux

- Select the Internet Protocol: Most Internet Service Providers (ISPs) provide dynamic IP addresses, hence the default "Obtain an IP Address Automatically". Should this not be the case, select the "Use the Following IP Address" option. The screen refreshes. Enter the IP Address, Subnet Mask, Default Gateway, and DNS Server details provided to you by your ISP.

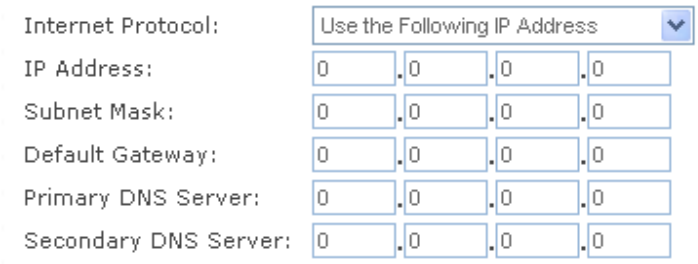


Figure 4.38. ETHoA - Static IP Address

4.4.1.7. Bridged Ethernet Connection over ATM (ETHoA)

1. Select 'Bridged Ethernet Connection over ATM (ETHoA)' from the 'Connection Type' combo box:

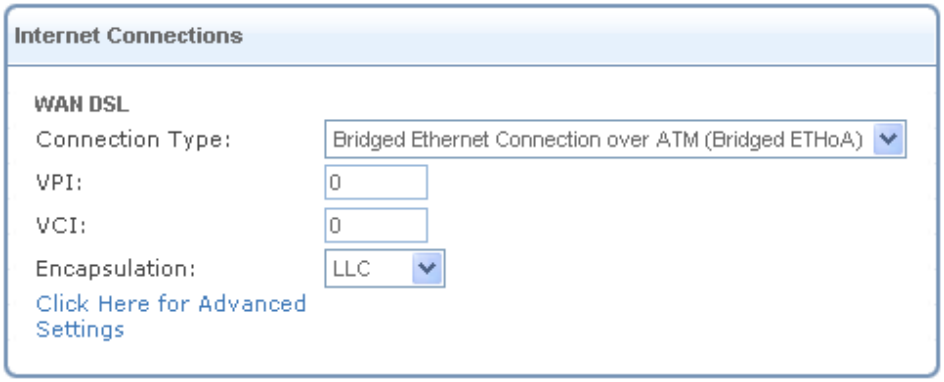


Figure 4.39. Internet Connection - Bridged ETHoA

2. Your Internet Service Provider (ISP) should provide you with the following information:
   - Specify the value of the VPI and VCI parameters.
   - Select the encapsulation method from the combo box. You can choose among the following methods:
     - LLC
     - VCMux

4.4.1.8. Classical IP over ATM (CLIP)

1. Select 'Classical IP over ATM (CLIP)' from the 'Connection Type' combo box:

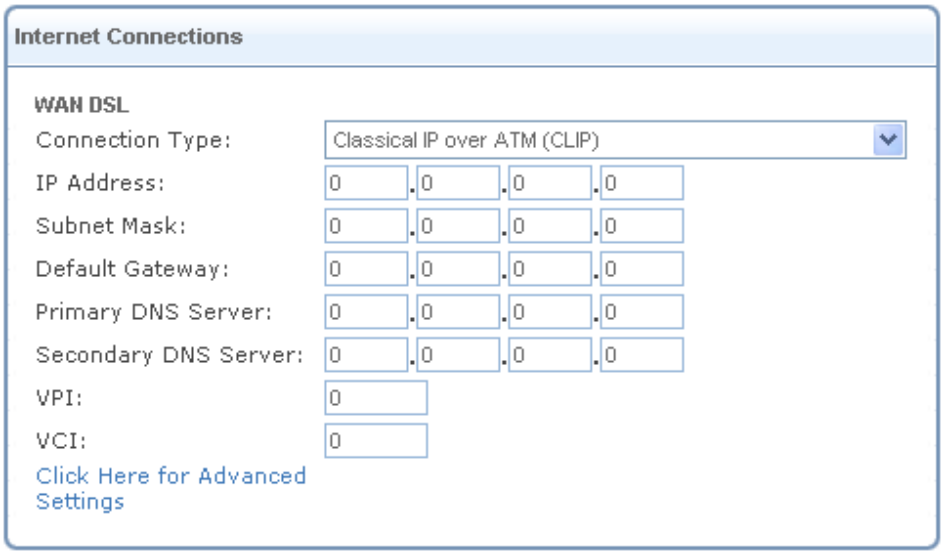


Figure 4.40. Internet Connection - CLIP

2. According to your Internet service provider's instructions, configure the following network connection parameters:

   - IP Address
   - Subnet Mask
   - Default Gateway IP address
   - Primary DNS Server IP address
   - Secondary DNS Server IP address
   - VPI
   - VCI

4.4.1.9. Point-to-point protocol over Ethernet (PPPoE)

1. Select 'Point-to-point protocol over Ethernet (PPPoE)' from the 'Connection Type' combo box:

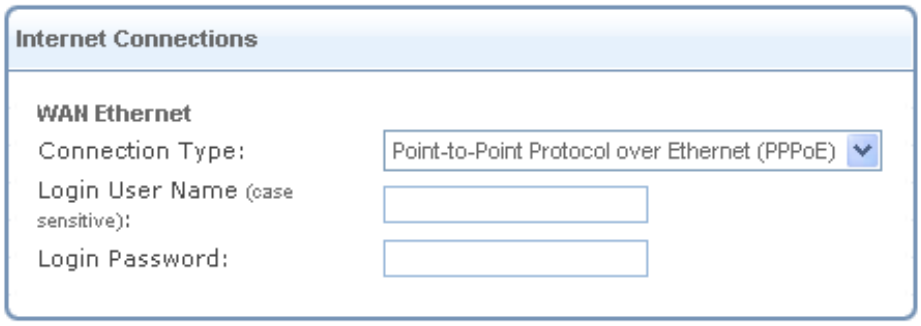


Figure 4.41. Internet Connection - PPPoE

2. Your Internet Service Provider (ISP) should provide you with the following information:

   - Login user name

- Login password

3. If your board features a DSL connection, you will see an 'Automatic PVC Scan' check box. Select this check box to enable the automatic configuration of the VPI, VCI and encapsulation parameters (relevant to DSL connections).

4.4.1.10. No Internet Connection

Select 'No Internet Connection' from the 'Connection Type' combo-box (see figure Figure 4.42). Choose this connection type if you do not have an Internet connection, or if you want to disable all existing connections.

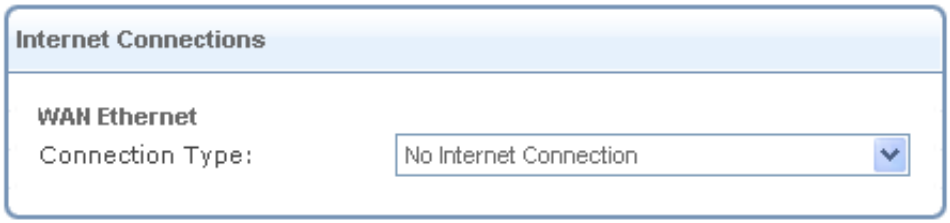


Figure 4.42. Internet Connection - No Internet Connection

4.4.2. Wireless

Click the 'Enabled' check box to enable your wireless connection.

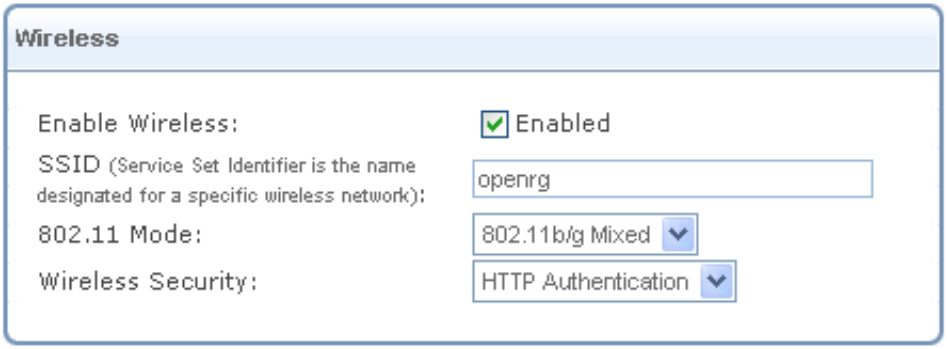


Figure 4.43. Internet Connection - Wireless

Specify the wireless network's ID in the 'SSID' field. The default SSID is 'openrg'. For a full description of the LAN Wireless connection, please refer to section Section 8.4.6 .

4.4.3. Jungo.net

This screen section enables you to connect to the Jungo.net portal, through which you can upgrade OpenRG with advanced broadband services. An additional benefit of using Jungo.net is that it configures the services automatically, thereby saving you time and effort. To start activating the Jungo.net services on your gateway, you need to first obtain a personal Jungo.net account. The account details must then be entered in the respective login fields (see figure Figure 4.44), in order to associate the gateway with the account and connect it to the Jungo.net portal.

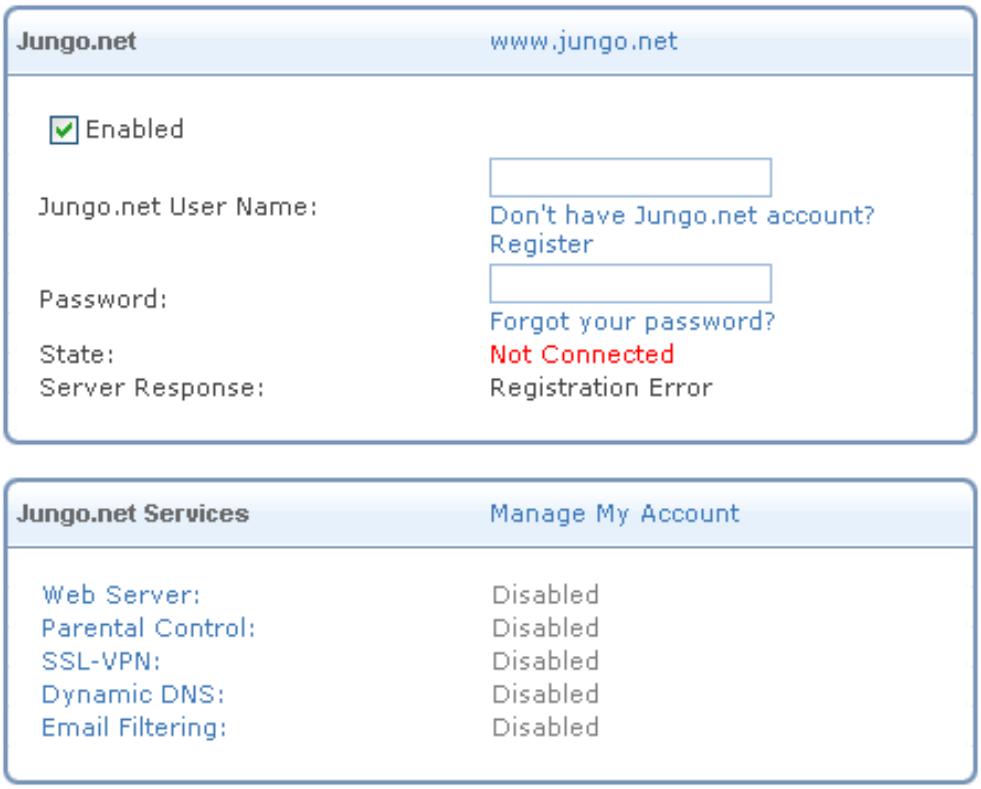


Figure 4.44. Jungo.net

The 'Jungo.net Services' section displays the Jungo.net services that are pre-embedded in OpenRG. You can either configure them manually, or let the Jungo.net portal configure them automatically. These services are:

- Web Server (for more information, refer to section Section 7.11.4)
- Parental Control (for more information, refer to section Section 7.8)
- SSL-VPN (for more information, refer to section Section 7.10.2)
- Dynamic DNS (for more information, refer to section Section 7.12)
- Email Filtering (for more information, refer to section Section 7.9)

For more information about the Jungo.net portal and its operation, refer to section Section 7.2 .

4.4.4. Quick Setup Completed

OpenRG does not require further configuration in order to start working. After the setup described in this chapter, you can immediately start using your gateway to:

- Share a broadband connection among multiple users (HTTP, FTP, Telnet, NetMeeting) and between all of the computers connected to your home network.
- Build a home network by connecting additional PCs and network devices to the gateway.
- Share resources (file servers, printers, etc.) between computers in the home network using their names; auto-learning DNS enables OpenRG to automatically detect the network identification names of the LAN PCs, enabling mutual communication using names, not IP addresses.
- Control network parameters, including DHCP, DNS and WAN settings.

- View network status, traffic statistics, system log and more.
- Allow access from the Internet to games and other services provided by computers in the home network.
- Prohibit computers in the home network from accessing selected services on the Internet.
- Block access to specific Internet Web sites from your home network.

To learn about how to configure your Firewall security parameters, please refer to section Section 7.3 . If you wish to apply corporate-grade security to your network, please refer to section Section 7.3.11 . If your gateway is equipped with multiple LAN ports, you can connect additional devices directly to the gateway. Otherwise, connect a hub or switch to the LAN port, to which you can connect additional devices. In both cases, configure newly connected devices to automatically obtain IP address as described above.

5

Internet Connection

5.1. Overview

The 'Overview' screen (see figure Figure 5.1) provides general information regarding your WAN Internet connection, such as the connection's status, protocol, speed, duration, and Internet address. Refer to this screen for a quick status reference.

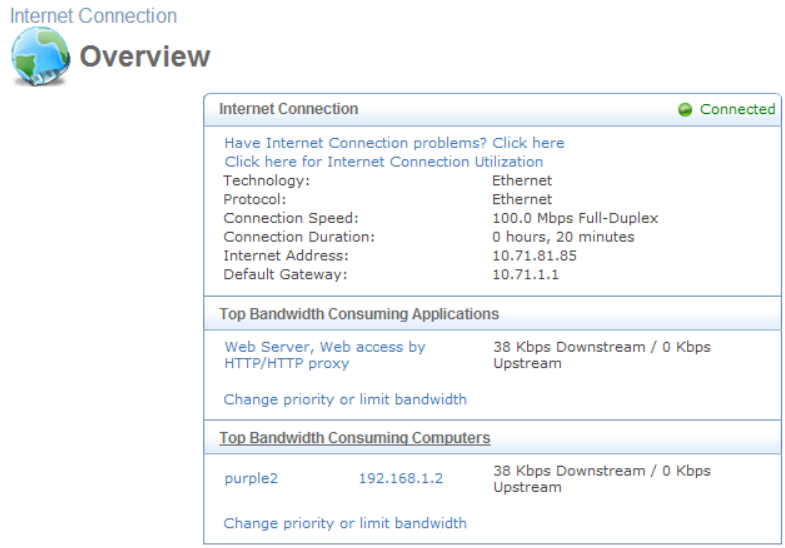


Figure 5.1. Internet Connection -- Overview

The following links are available:

- **Have Internet Connection problems? Click here** This link routes you to the 'Diagnostics' screen under the 'Internet Connection' tab, where you can run tests in order to diagnose and resolve Internet connectivity problems (for more information, refer to section Section 5.4).
- **Click Here For Internet Connection Utilization** Click this link to analyze the traffic usage of your WAN connection (for more information, refer to section Section 7.4.2).

In addition, this screen displays OpenRG's top bandwidth consuming applications and computers. For more information, refer to section Section 11.4.

5.2. Settings

The 'Settings' screen (see figure Figure 5.2) provides basic configuration options for the different types of connections available with OpenRG. Configure your WAN connection according to the method by which you are connected to the Internet. For more information, please refer to section Section 4.4.1.

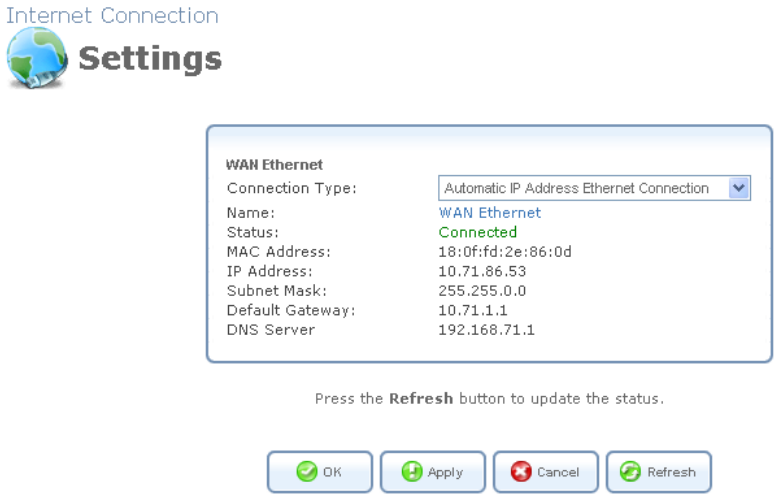


Figure 5.2. Internet Connection -- Settings

5.3. Advanced Settings

The 'Advanced Settings' screen (see figure Figure 5.3) provides all configuration options for your WAN connection. Please refer to section Section 8.4.7 for more information.

Figure 5.3. Internet Connection -- Advanced Settings

5.4. Diagnostics

The 'Diagnostics' screen (see figure Figure 5.4) provides a series of tests aimed at validating your gateway's Internet connection.

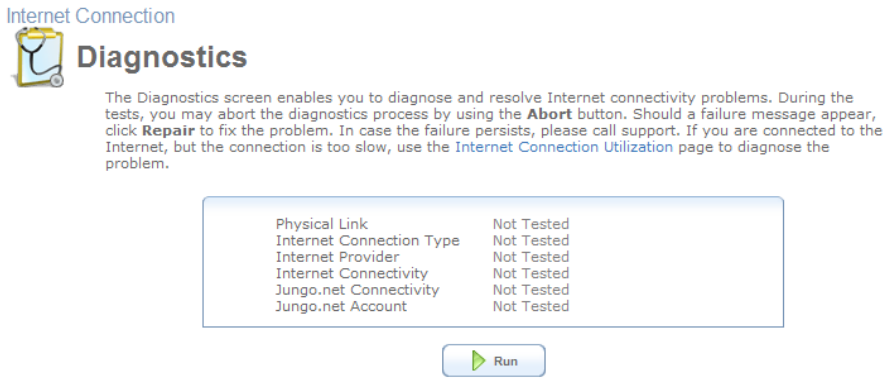

Internet Connection
Diagnostics
The Diagnostics screen enables you to diagnose and resolve Internet connectivity problems. During the tests, you may abort the diagnostics process by using the Abort button. Should a failure message appear, click Repair to fix the problem. In case the failure persists, please call support. If you are connected to the Internet, but the connection is too slow, use the Internet Connection Utilization page to diagnose the problem.
Physical Link
Not Tested
Internet Connection Type
Not Tested
Internet Provider
Not Tested
Internet Connectivity
Not Tested
Jungo.net Connectivity
Not Tested
Jungo.net Account
Not Tested
Run

Figure 5.4. Internet Connection -- Diagnostics

Click 'Run' to begin the test routine. While testing is in progress, you may abort the diagnostics process by using the 'Abort' button. Should a failure message appear, click 'Repair' to initiate the Installation Wizard procedure (refer to section Section 4.3).

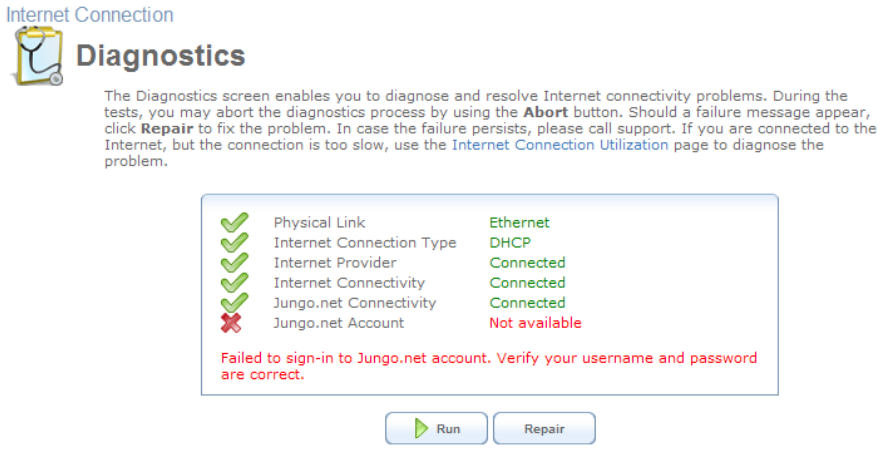

Internet Connection
Diagnostics
The Diagnostics screen enables you to diagnose and resolve Internet connectivity problems. During the tests, you may abort the diagnostics process by using the Abort button. Should a failure message appear, click Repair to fix the problem. In case the failure persists, please call support. If you are connected to the Internet, but the connection is too slow, use the Internet Connection Utilization page to diagnose the problem.
Physical Link
Ethernet
Internet Connection Type
DHCP
Internet Provider
Connected
Internet Connectivity
Connected
Jungo.net Connectivity
Connected
Jungo.net Account
Not available
Failed to sign-in to Jungo.net account. Verify your username and password are correct.
Run
Repair

Figure 5.5. Diagnostics Process

6

Local Network

6.1. Overview

The 'Overview' screen presents OpenRG's network summary. This includes all connected devices: computers, disks, printers and phones. When this screen is loaded, OpenRG begins the process of automatically detecting the network services available on connected computers (hosts).

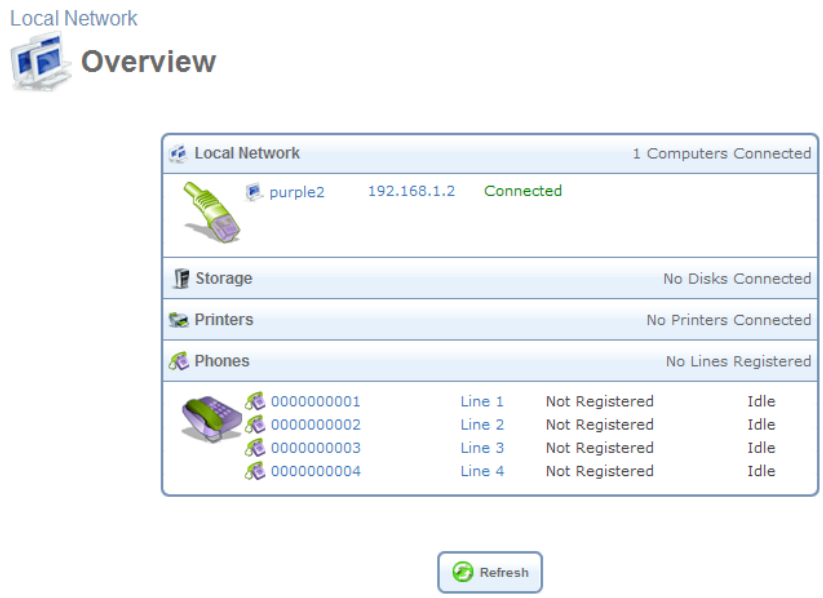


Figure 6.1. Network Services Detection

The screen then refreshes, displaying each computer's network services.

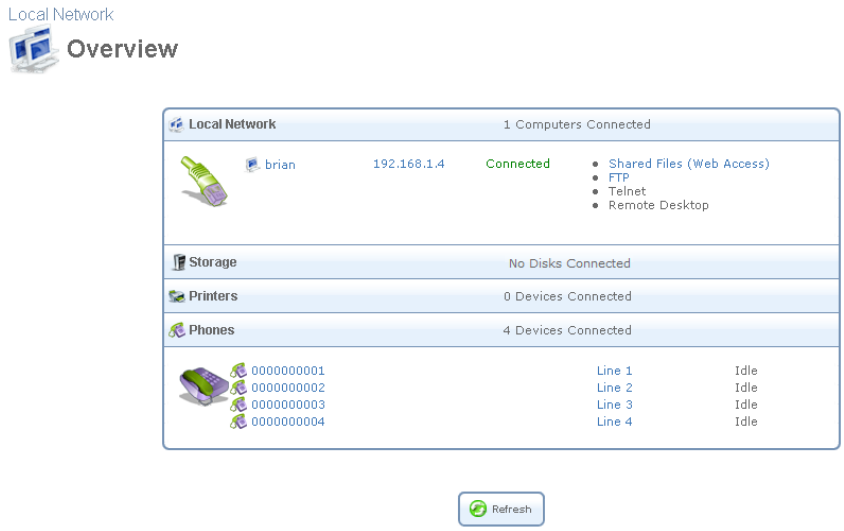


Figure 6.2. Local Network Overview

To view more information on a specific computer, click its respective link. The 'Host Information' screen appears.

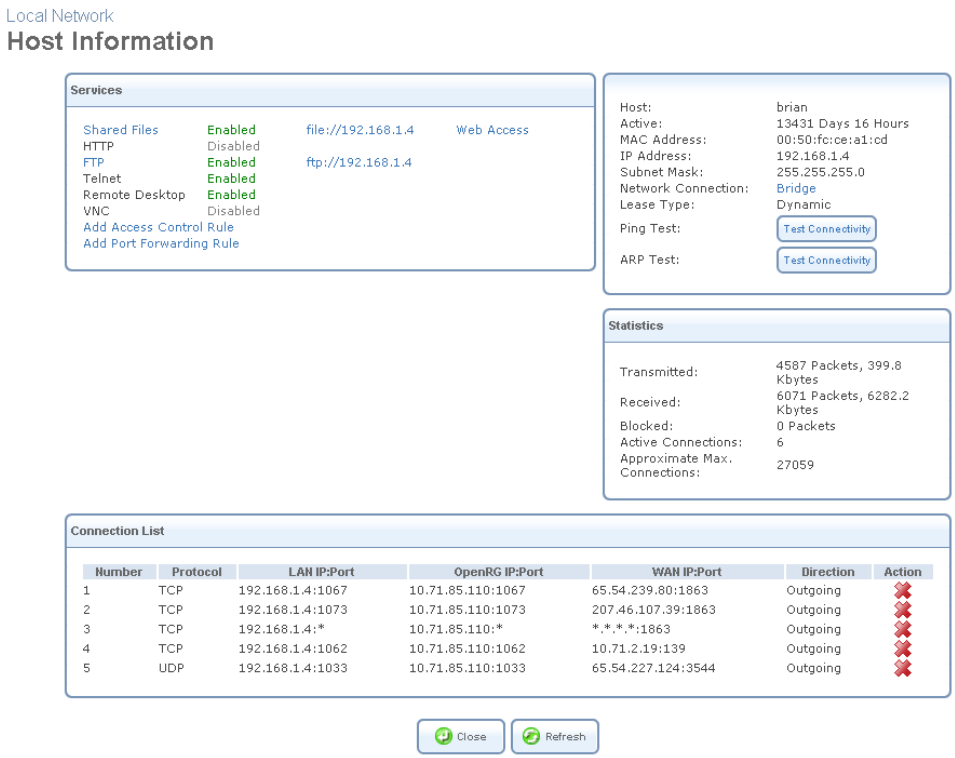


Figure 6.3. Host Information

This screen presents all of the information relevant to the connected computer, such as connection information, available services, traffic statistics, and connection list. It also enables you to perform connectivity tests with the computer.

Services This section lists the services on the computer that are available to other computers either from the LAN, via Web access (SSL-VPN), or from both. Services are accessible only when enabled on the computer. Services available via SSL-VPN require a secure (HTTPS) connection (for more information, refer to section Section 7.10.2). When a service is accessible from the LAN, you can activate it by either clicking its name or the URL that appears (see figure Figure 6.3). When a service is accessible via Web access, you can activate it by clicking the 'Web Access' link that appears. Available services are:

Shared Files Access the computer's shared files directory.

HTTP Access the computer's HTTP server (if available).

FTP Open an FTP session with the computer.

Telnet Open a Telnet session with the computer.

Remote Desktop Remotely control a Windows computer with the Remote Desktop utility.

VNC Remotely control the computer with the Virtual Network Computing desktop protocol.

Add Access Control Rule Block access to Internet services from the computer, or allow access if the firewall is set to a "High" security level (for more information, refer to section Section 7.3.2).

Add Port Forwarding Rule Expose services on the computer to external Internet users (for more information, refer to section Section 7.3.3).

Connection Information This section displays various details regarding the computer's connection settings. To view the connection's properties, click the network connection type ('Bridge' in the above example). The relevant properties screen appears (for more information, see section Section 8.4). Additionally, you can run a Ping or ARP test by clicking the respective 'Test Connectivity' button. The tests are performed in the 'Diagnostics' screen (see section Section 8.8.7).

Statistics This section displays the computer's traffic statistics, such as the number and size of transmitted and received packets.

Connection List This section displays the list of connections opened by the computer on OpenRG's firewall. The table displays the computer's source LAN IP address and port, the gateway's IP address and port to which it is translated, and the destination WAN IP address and port.

6.2. Device View

The 'Device View' screen (see figure Figure 6.4) presents a summary of OpenRG's LAN devices, including a bridge (if one exists), Ethernet, USB and wireless, and the status of each one (connected/disconnected).

Figure 6.4. Local Network Device View

6.3. Wireless

6.3.1. Overview

The 'Overview' screen (see figure Figure 6.5) presents OpenRG's wireless connection summary.

Figure 6.5. Wireless Overview

Enable Wireless Check or uncheck this box to enable or disable the wireless connection.

SSID The SSID is the network name shared among all points in a wireless network. The SSID must be identical for all points in the wireless network. It is case-sensitive and must not exceed 32 characters (use any of the characters on the keyboard). Make sure this setting is the same for all points in your wireless network. For added security, you should change the default SSID (openrg) to a unique name.

802.11 Mode Specifies the type of the connection.

Security Select the security type for the connection: None, Web authentication, or Password Protected (WPA).

Pre-Shared Key This field appears when selecting WPA, enabling you to enter a value that will serve as the encryption key for the connection.

6.3.2. Settings

The 'Settings' screen (see figure Figure 6.6) provides basic configuration options for OpenRG's wireless connection.

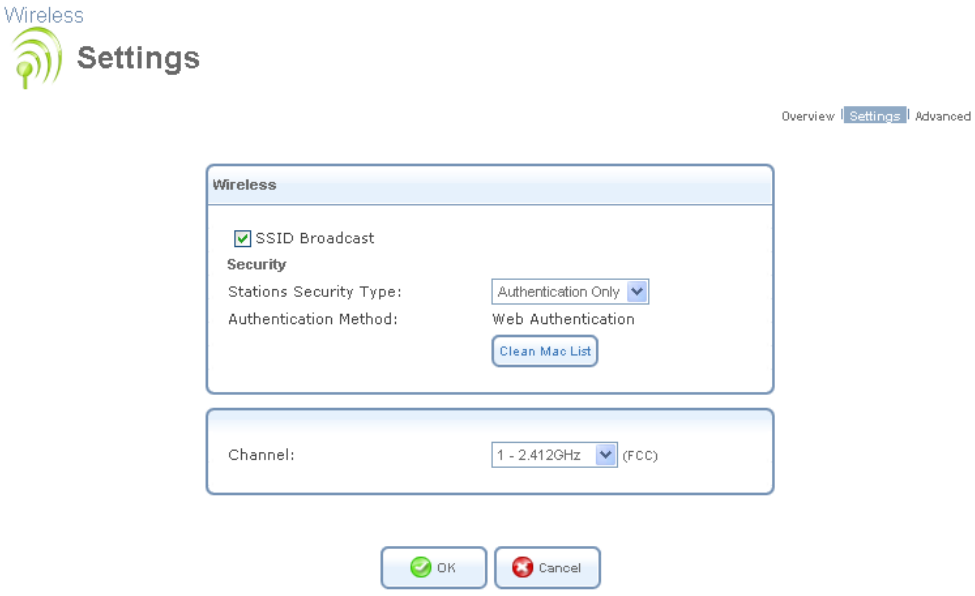


Figure 6.6. Wireless Settings

To learn more about these configuration options, please refer to section Section 8.4.6.8 .

6.3.3. Advanced

Clicking the 'Advanced' tab displays the 'LAN Wireless 802.11g Access Point Properties' screen (see figure Figure 6.7), providing all wireless configuration options.

Figure 6.7. LAN Wireless 802.11g Access Point Properties

Please refer to section Section 8.4.6 for detailed explanations of this screen and its tabs.

6.4. Shared Storage

OpenRG can operate as a disk manager for either internal disks, connected via IDE, or external storage devices, connected via USB or FireWire. Your home-network's LAN devices can share this storage device as a mapped network drive, and exchange information without directly accessing each other. The Web-based management provides disk management utilities such as partitioning and formatting.

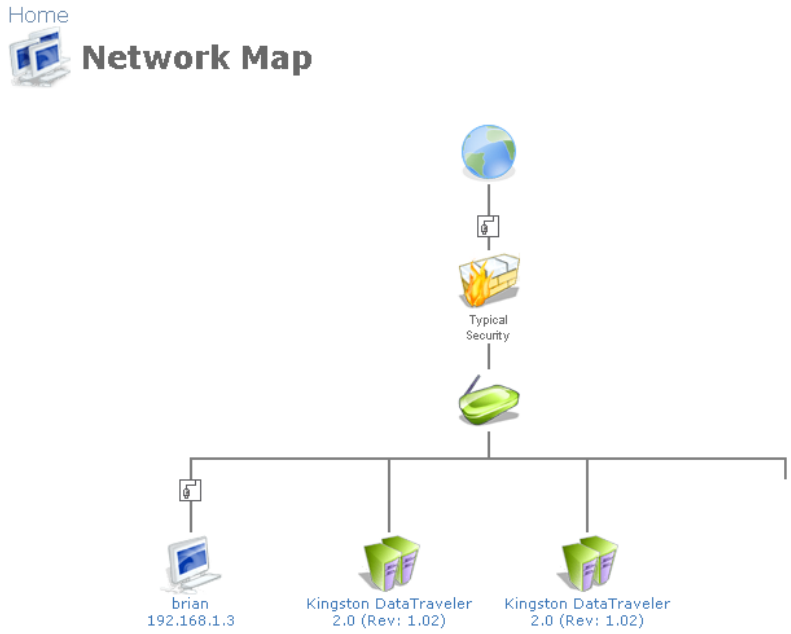


Figure 6.8. Network Map

An internal disk or a connected storage device appears on the network map, as depicted in figure Figure 6.8 . You can view information about the disk by clicking its icon. The 'Disk Information' screen appears.

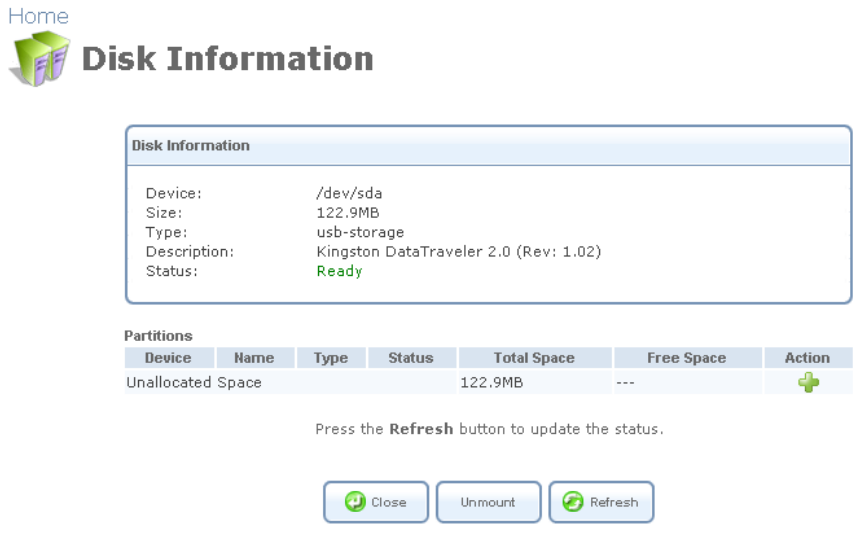


Figure 6.9. Disk Information

OpenRG supports storage devices with FAT32, NTFS, and Linux EXT2/3 file systems. These file systems have different sharing and security settings. For more information, refer to section Section 7.11.2.2 [349]. If the connected storage device, or at least one of its partitions, has the NTFS file system, the following 'Attention' message appears in the 'Disk Information' screen.

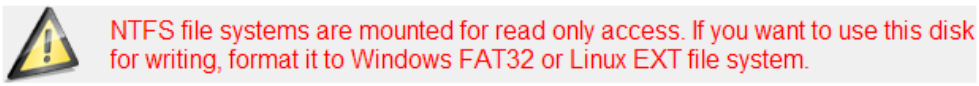

NTFS file systems are mounted for read only access. If you want to use this disk for writing, format it to Windows FAT32 or Linux EXT file system.

Figure 6.10. NTFS Read-only Access

Note: OpenRG based on the Conexant Solos, Mindspeed Malindi2 or Freescale platform allows both *Read* and *Write* access to an NTFS partition.

For a broader view, click the 'Shared Storage' tab in the 'Local Network' screen of the WBM. The 'Disk Management' screen appears.

Figure 6.11. Disk Management

Note: As the error message suggests, in order to define a system storage area, the disk or at least one of its partitions should be formatted. This storage area will hold the data used by OpenRG's services (refer to section Section 6.4.2). For security reasons, it is recommended to format the disk or its partition in the EXT2 or EXT3 file system, although FAT32 is supported as well.

Enabled Check or un-check this box to enable or disable this feature.

Automatically Create System Storage Area When Not Available When this option is selected, OpenRG automatically sets the first identified formatted partition as the location of the system storage area. This setting is valid until the storage device is disconnected. When reconnected, OpenRG may select another partition for this purpose. To define the system storage area manually, deselect this check box. The screen refreshes displaying the 'System Storage Area' field, in which you must enter the partition's letter.

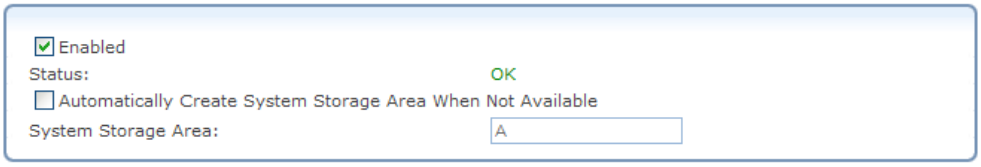
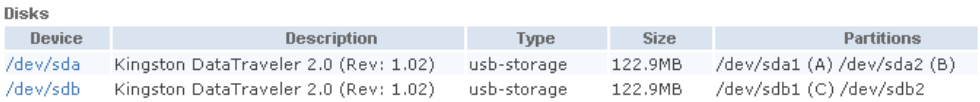


Figure 6.12. Manually Defined System Storage Area

In this case, the setting remains permanent, even after the storage device is disconnected, and reconnected afterwards.

Disks This section displays a table with your connected storage devices. The 'Device' column displays the names OpenRG grants connected devices. Click this link to view the device's 'Disk Information' screen (see figure Figure 6.9). If a disk is partitioned, the 'Partitions' column will display its partition names. If the partitions are formatted, their name will include a letter.



Disks

Device	Description	Type	Size	Partitions
/dev/sda	Kingston DataTraveler 2.0 (Rev: 1.02)	usb-storage	122.9MB	/dev/sda1 (A) /dev/sda2 (B)
/dev/sdb	Kingston DataTraveler 2.0 (Rev: 1.02)	usb-storage	122.9MB	/dev/sdb1 (C) /dev/sdb2

Figure 6.13. Disks

RAID Devices This section displays the RAID devices when configured (refer to section Section 6.4.3).

6.4.1. Partitioning

Before using the disk, ensure that it has at least one formatted partition. OpenRG's WBM provides you with all the tools needed to easily and quickly configure your storage device.

Note: When applying administrative changes to OpenRG's storage devices as described in the following sections, services using these devices will be stopped.

6.4.1.1. Adding a New Partition

1. Click the disk device link in the 'Disks' section of the 'Disk Management' screen. The 'Disk Information' screen appears (see figure Figure 6.9).

Note: You can only add a partition if your disk has unallocated space on it. An 'Unallocated space' row will appear in the 'Partitions' section of the 'Disk Information' screen (see figure Figure 6.9), displaying the free space size and an action icon .

2. In the 'Partitions' section, click the action icon . The 'Partition Type' screen appears.

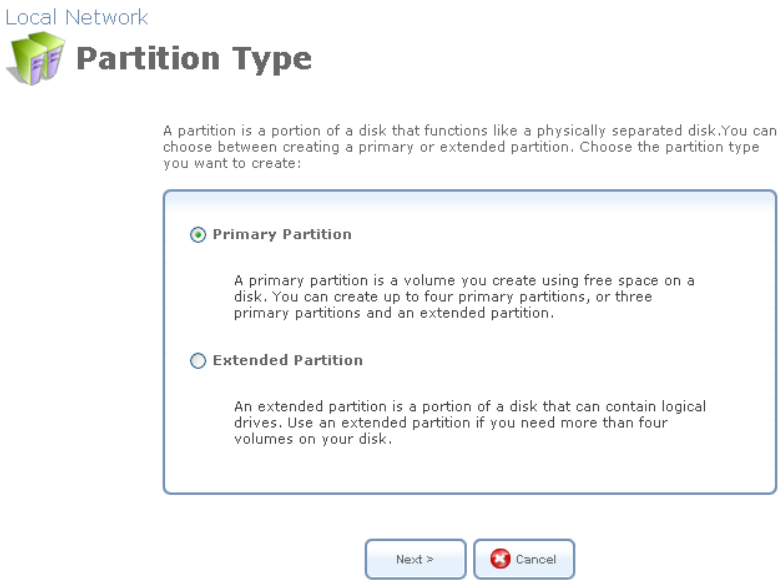

Local Network
Partition Type
A partition is a portion of a disk that functions like a physically separated disk.You can choose between creating a primary or extended partition. Choose the partition type you want to create:
Primary Partition
A primary partition is a volume you create using free space on a disk. You can create up to four primary partitions, or three primary partitions and an extended partition.
Extended Partition
An extended partition is a portion of a disk that can contain logical drives. Use an extended partition if you need more than four volumes on your disk.
Next >
Cancel

Figure 6.14. Partition Type

3. Choose between a primary or an extended partition, and click 'Next'.

4. In the 'Partition Size' screen that appears (see figure Figure 6.15), enter a volume for the new partition (in MB) and click 'Next'.

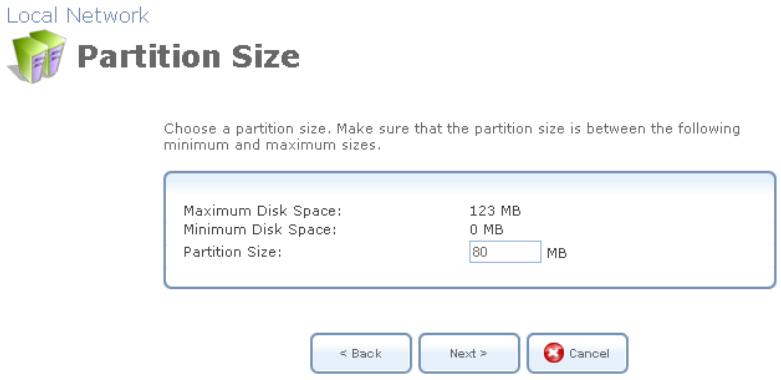

Local Network
Partition Size
Choose a partition size. Make sure that the partition size is between the following minimum and maximum sizes.
Maximum Disk Space: 123 MB
Minimum Disk Space: 0 MB
Partition Size: 80 MB
< Back
Next >
Cancel

Figure 6.15. Partition Size

5. If you are creating a primary partition, the 'Partition Format' screen will appear (see figure Figure 6.16). Otherwise, skip to the last step. Choose whether or not to format the partition, and click 'Next'.

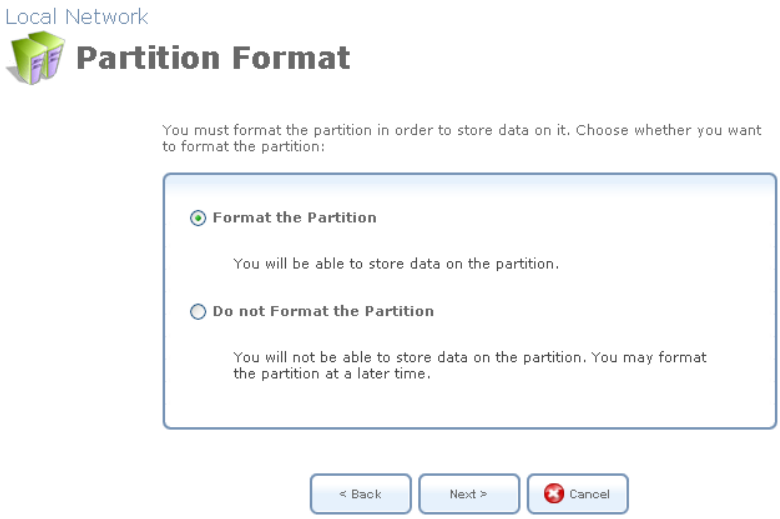

Local Network
Partition Format
You must format the partition in order to store data on it. Choose whether you want to format the partition:
Format the Partition
You will be able to store data on the partition.
Do not Format the Partition
You will not be able to store data on the partition. You may format the partition at a later time.
< Back
Next >
Cancel

Figure 6.16. Partition Format

6. If you chose to format the partition, the 'Partition File System' screen appears (see figure Figure 6.17). Otherwise, skip to the next step. Select a file system for the partition in the combo box and click 'Next'.

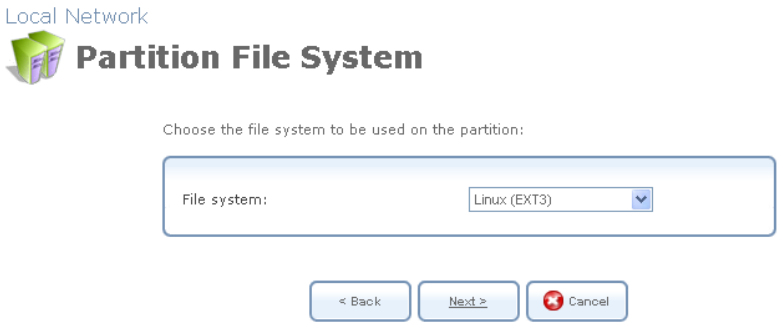


Figure 6.17. Partition File System

7. The 'Partition Summary' screen appears (see figure Figure 6.18). Click 'Finish' to create the new partition.

Figure 6.18. Partition Summary

The 'Disk Information' screen will reappear, refreshing as the partition formatting progresses (see figure Figure 6.19), until the status changes to 'Ready' (see figure Figure 6.20).

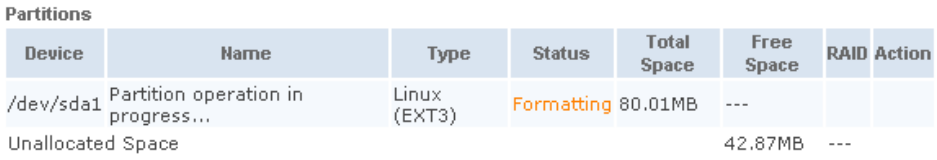


Figure 6.19. Partition Formatting in Progress

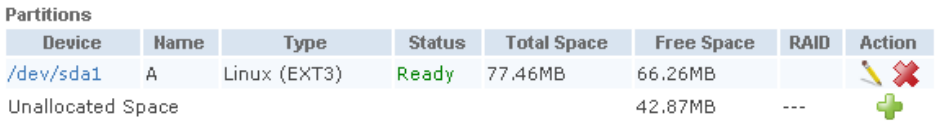


Figure 6.20. Formatting Complete - Partition Ready

The new partition names are designated as "A", "B", etc, and appear under the 'Name' column of the 'Partitions' section (see figure Figure 6.20).

6.4.1.2. Deleting a Partition

1. Click the disk device link in the 'Disks' section of the 'Disk Management' screen. The 'Disk Information' screen appears.

2. In the 'Partitions' section, click the action icon of the partition you would like to delete (see figure Figure 6.20). A warning screen appears (see figure Figure 6.21), alerting you that all the data on the partition will be lost.

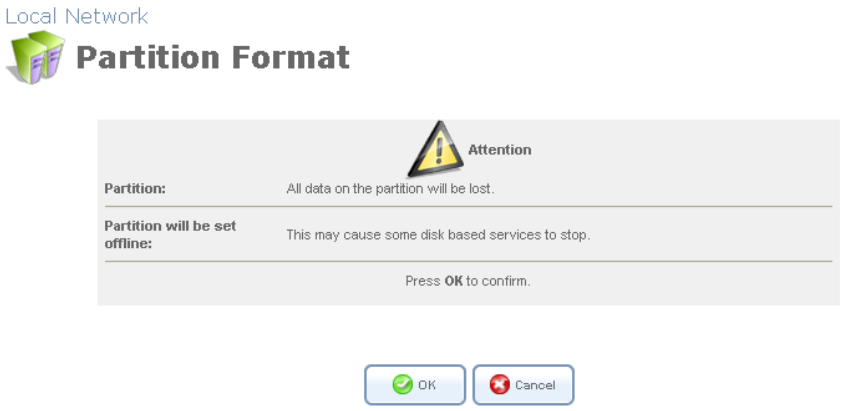


Figure 6.21. Lost Data Warning

3. Click 'OK' to delete the partition.

6.4.1.3. Formatting a Partition

1. Click the disk device link in the 'Disks' section of the 'Disk Management' screen. The 'Disk Information' screen appears.

2. In the 'Partitions' section, click the action icon of the partition you would like to edit (see figure Figure 6.20). The 'Partition Properties' screen appears.

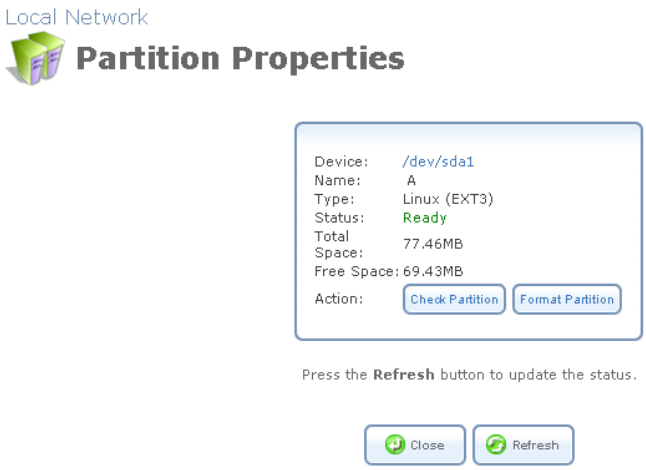


Figure 6.22. Partition Properties

3. Press the 'Format Partition' button. The 'Partition Format' screen appears.

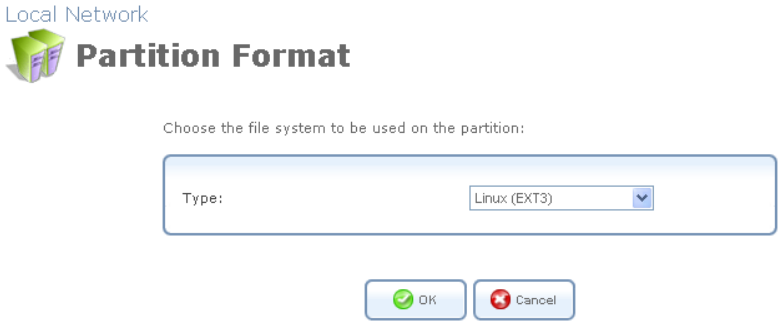


Figure 6.23. Partition Format

Note: A partition can be formatted in EXT2, EXT3, FAT32 and NTFS file systems.

4. From the drop-down menu, select a file system for the partition and click 'Next'. A warning screen appears (see figure Figure 6.24), alerting you that all the data on the partition will be lost.

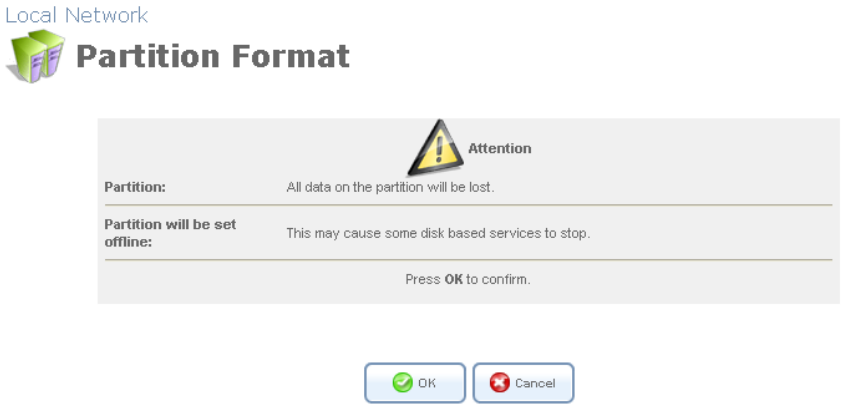


Figure 6.24. Lost Data Warning

5. Click 'OK' to format the partition. The screen will refresh as the partition formatting progresses (see figure Figure 6.25).

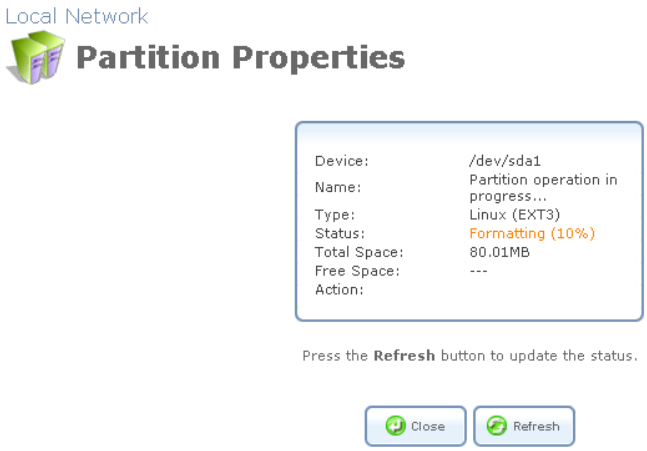


Figure 6.25. Partition Formatting in Progress

When the format is complete, the status will change to 'Ready' (see figure Figure 6.26).

Figure 6.26. Formatting Complete - Partition Ready

6.4.1.4. Checking a Partition

1. Click the storage device link in the 'Disks' section of the 'Disk Management' screen. The 'Disk Information' screen appears.

2. In the 'Partitions' section, click the action icon of the partition you would like to check (see figure Figure 6.20). The 'Partition Properties' screen appears (see figure Figure 6.27).

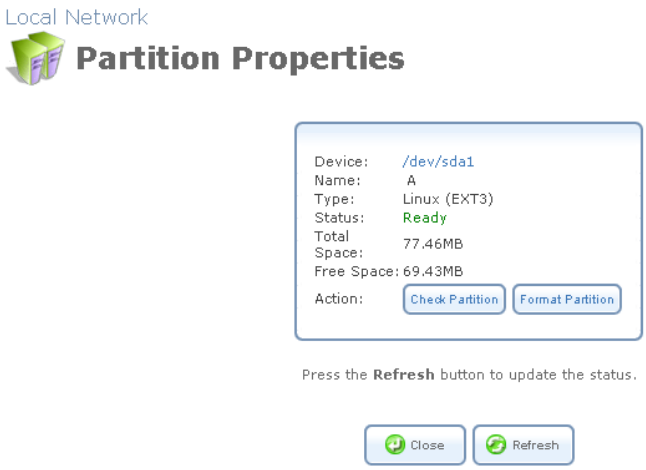


Figure 6.27. Partition Properties

3. Press the 'Check Partition' button. A warning screen appears, alerting you that the partition will be set to offline.

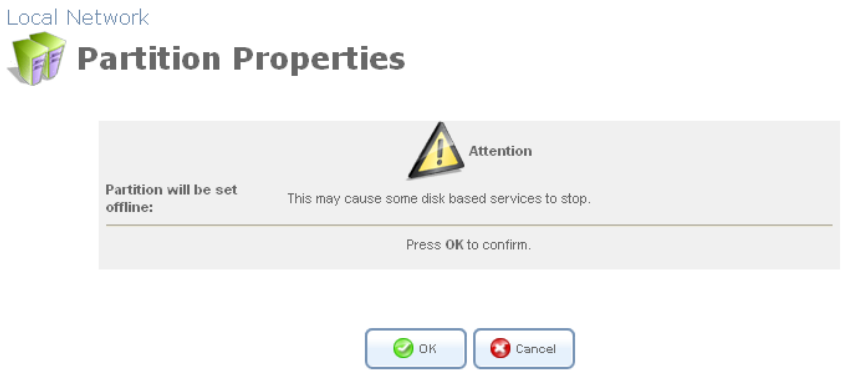


Figure 6.28. Offline Partition Warning

4. Click 'OK' to check the partition. The screen refreshes as the partition checking progresses (see figure Figure 6.29).

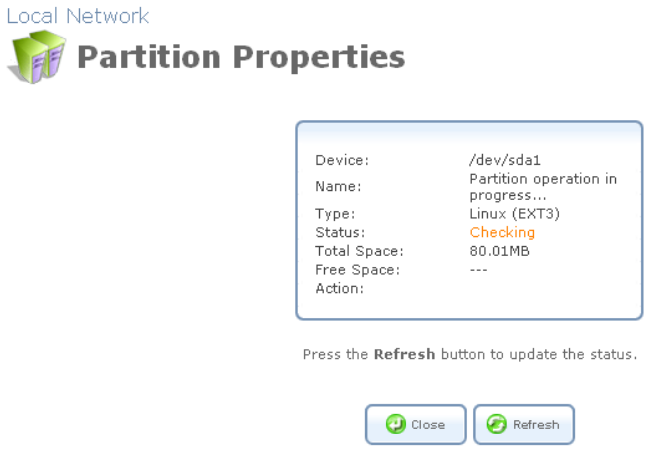


Figure 6.29. Partition Checking in Progress

When the check is complete, the status will change to 'Ready' (see figure Figure 6.30).

Figure 6.30. Checking Complete - Partition Ready

6.4.2. System Storage Area

OpenRG uses a specific location on a storage device for storing data used by its various services. The following are the services, which use the system storage area:

- Printer spool and drivers
- Mail server spool
- Backup of OpenRG's configuration file (rg_conf)
- PBX-related audio files for voice mail, auto attendants and music on-hold
- FTP server
- Mail boxes information
- Users' home directories
- Web server content

Prior to enabling these services, you should create either EXT2/3 (recommended) or FAT32 partitions, as described in section Section 6.4.1.1 [55], and define at least one of them as the system storage area.

Note: Data cannot be written to partitions formatted with NTFS, unless OpenRG is based on the Conexant Solos, Mindspeed Malindi2 or Freescale platform. Consequently, if you define an NTFS partition as the system storage area, the services mentioned earlier will not operate on OpenRG, displaying a warning message.

To define a system storage area, perform the following:

1. Click the 'Shared Storage' tab in the 'Local Network' screen of the WBM. The 'Disk Management' screen appears.
2. Deselect the **Automatically Create System Storage Area When Not Available** check box. The screen refreshes displaying the 'System Storage Area' field, in which you must enter the partition's letter.

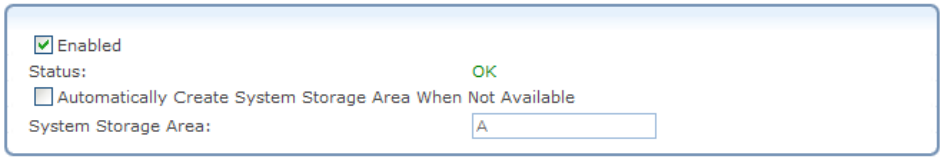


Figure 6.31. Manually Defined System Storage Area

3. Click 'OK' to save the settings.

If you wish to view the system directories, verify that the system storage area is shared (refer to section Section 7.11.2.1). Then, browse to `openrg` .

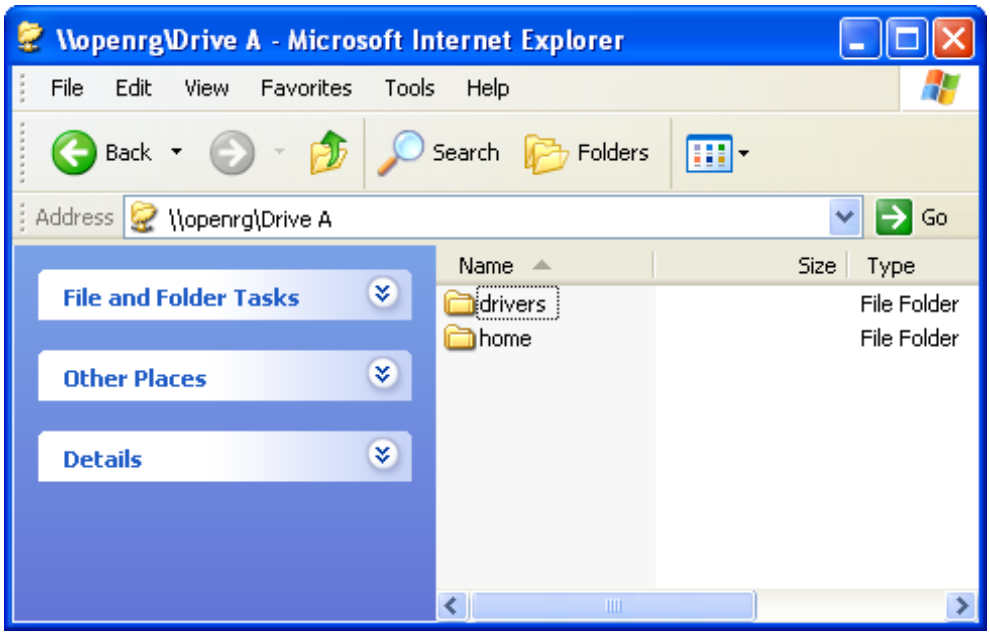


Figure 6.32. System Storage Area Directories

6.4.3. RAID Management

OpenRG supports Redundant Array of Independent Disks (RAID) on storage devices connected to the gateway internally, by USB or by FireWire. A RAID device is a logical device that has physical devices underlying it. These physical devices are disk partitions. The supported RAID levels are:

- Level 0 -- Provides data striping, or spreading out blocks of each file across multiple disk drives, but no redundancy. This improves performance but does not deliver fault tolerance. If one drive fails then all data in the array is lost.
- Level 1 -- Provides disk mirroring. This is a technique in which data is written to two duplicate disks simultaneously, providing data redundancy. This method improves performance and delivers fault tolerance.
- Level 5 -- With a minimum of three disks, this level provides data striping and utilizes one disk for backup information, which enables it to restore any other disk in the array.

Before creating the RAID device, you must create disk partitions (see section Section 6.4.1.1 [55]) on the different disk drives. Each RAID device can have multiple underlying devices (partitions). When using RAID1, it is recommended that these partitions be of the same size, to avoid disk-space loss due to mirroring. A disk partition configured with RAID can no longer be managed as a regular partition, but only be controlled by the RAID device. From the moment RAID is configured, it is the RAID device that can be shared, scanned, formatted and mounted as a regular partition.

6.4.3.1. Creating a RAID Device

To create a RAID device:

1. Click the 'Shared Storage' tab in the 'Local Network' screen of the WBM. The 'Disk Management' screen appears (see figure Figure 6.11).

2. Click the 'Add RAID Device' link in the 'RAID Devices' section. The 'RAID Properties' screen appears:

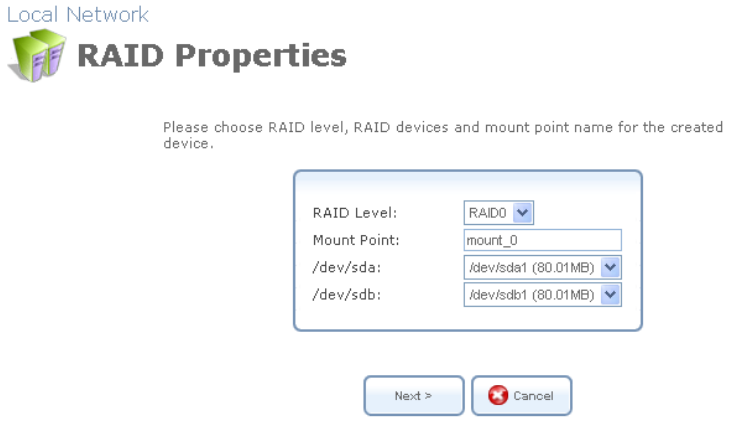


Figure 6.33. RAID Properties

3. In the 'RAID Properties' screen:

   1. Choose the RAID level (RAID0, RAID1 or RAID5) from the combo box.

   2. Choose the underlying devices (your pre-configured partitions) in the next two combo boxes. For RAID1 you may choose only one device and later add another one.

   3. Type a name for the mount point of the RAID device in the 'Mount Point' field.

   4. Click 'Next'.

4. In the 'Partition Format' screen, choose 'Format the partition' and click 'Next' (see figure Figure 6.34).

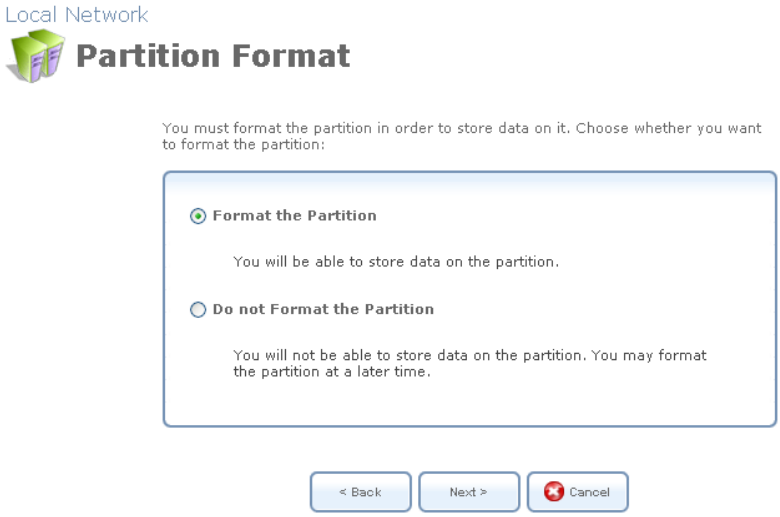

Local Network
Partition Format
You must format the partition in order to store data on it. Choose whether you want to format the partition:
Format the Partition
You will be able to store data on the partition.
Do not Format the Partition
You will not be able to store data on the partition. You may format the partition at a later time.
< Back
Next >
Cancel

Figure 6.34. Partition Format

5. Select the format type in the 'Partition File System' screen (see figure Figure 6.35) and click 'Next'.

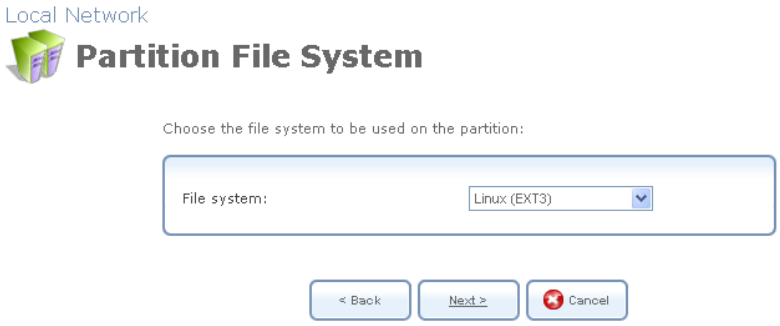


Figure 6.35. Partition File System

6. The 'Partition Summary' screen (see figure Figure 6.36) displays a summary of the chosen device properties. Press the 'Finish' button to execute the RAID device creation.

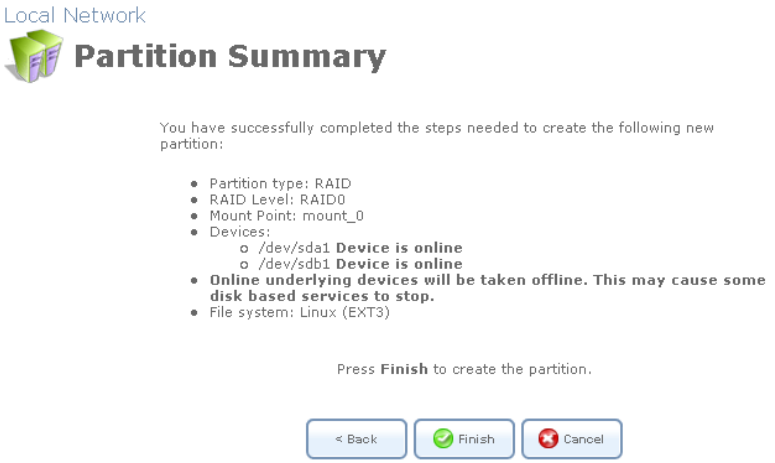

Local Network
Partition Summary
You have successfully completed the steps needed to create the following new partition:
Partition type: RAID
RAID Level: RAID0
Mount Point: mount_0
Devices:
/dev/sda1 Device is online
/dev/sdb1 Device is online
Online underlying devices will be taken offline. This may cause some disk based services to stop.
File system: Linux (EXT3)
Press Finish to create the partition.
< Back
Finish
Cancel

Figure 6.36. Partition Summary

As soon as a RAID device is created, its formatting will begin. If the device is RAID1 and has two underlying devices, its re-synchronization process (partition mirroring) will begin simultaneously. During re-synchronization the RAID device is fully usable, and can be mounted and used. Figure Figure 6.37 depicts a successful configuration of two RAID devices, as they appear in the 'Raid Devices' section of the 'File Server' screen. The first is RAID0, consisting of two underlying partitions (one on each disk), and the second is RAID1, consisting of another set of underlying partitions. Note that the RAID0 total space is the sum of the two partitions, while the RAID1 total space is the size of one partition (due to mirroring).

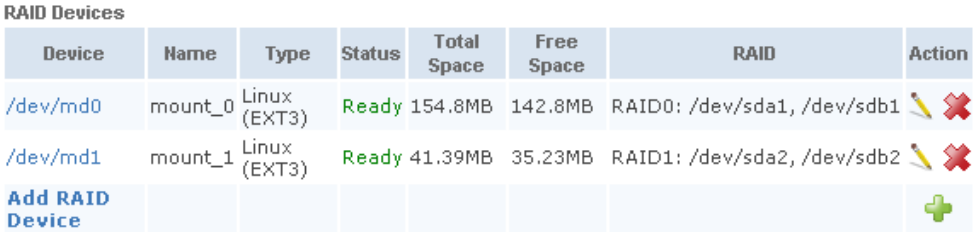


Figure 6.37. RAID Devices

6.4.3.2. Using a RAID Device

When RAID is configured over the existing partitions, these partitions are no longer independent. It is therefore necessary that you update the location of the system storage area:

1. Click the 'Disk Management' icon in the 'Advanced' screen of the Web-based management. The 'Disk Management' screen appears (see figure Figure 6.11).

2. Verify that the 'Automatically Create System Storage Area' check box is selected. If you wish to define the system storage area manually, deselect the check box and enter the name of the designated mount point.

3. Click 'OK' to save the settings.

6.4.3.3. Maintaining a RAID Device

A RAID device differs from a regular partition by not being part a of physical disk. It therefore resides and is maintained on OpenRG. RAID maintenance is divided into two aspects:

- Maintaining the RAID device itself:

    1. Click the action icon of the RAID device in the 'Disk Management' screen (see figure Figure 6.37).

    2. The 'RAID Properties' screen appears (see figure Figure 6.38), in which you can:

        1. Enable or disable the RAID device using the 'Enabled' check box.

        2. Change the mount point assigned to the device.

        3. Add or remove the underlying devices (can be done for RAID1 and RAID5 only).

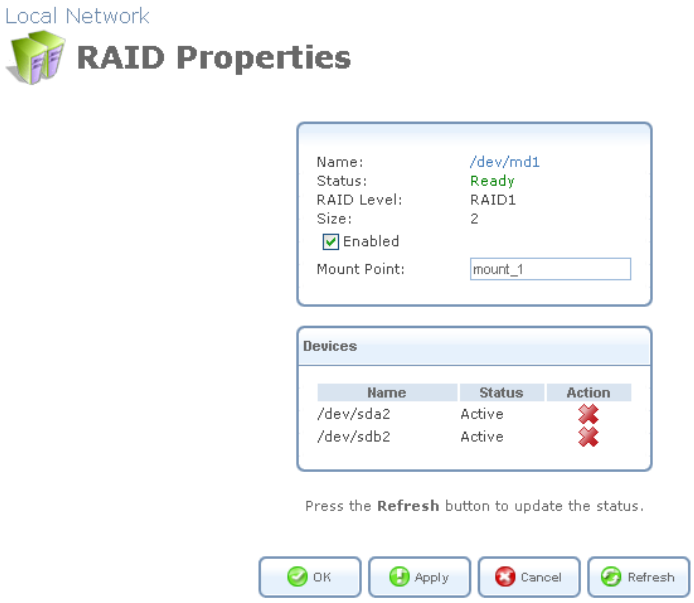


Figure 6.38. RAID Properties

- Maintaining the partition:

    1. Click the device name on the 'RAID Properties' screen (see figure Figure 6.38).

2. The 'Partition Properties' screen appears (see figure Figure 6.39), in which you can check (see section Section 6.4.1.4) and format (see section Section 6.4.1.3) the RAID partition.

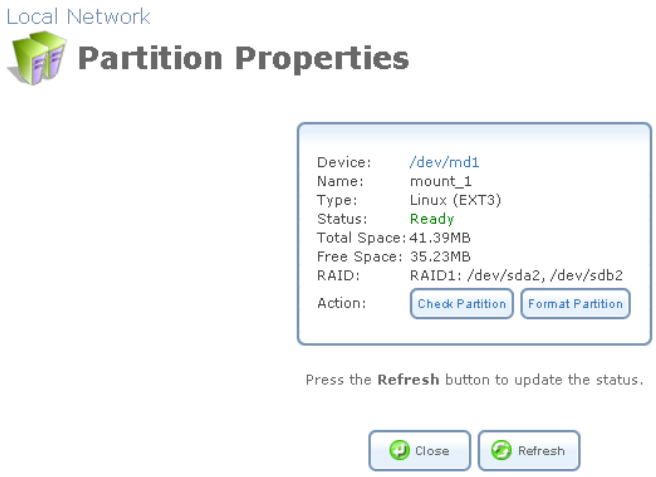


Figure 6.39. Partition Properties

6.4.3.4. Replacing RAID Underlying Devices

Adding or removing a RAID underlying device can only be performed on RAID1 and RAID5 configurations. RAID1 can operate with just one device (although mirroring will not be available), and RAID5 can operate with one device less than its original amount of devices. The names of the RAID underlying devices appear on the 'RAID Properties' screen (see figure Figure 6.38). Each device is followed by a status:

- Active: The device is controlled by RAID.
- Inactive: The device failed to join the RAID array or does not exist.
- Faulty: The device joined the RAID array but was marked as faulty due to an error. It is inactive and should be replaced.

Replacing a device on RAID1 or RAID5 is done by first removing the faulty device and then adding a new one. The new device's size must be at least the size of the existing one. To remove a faulty device from RAID1:

1. Click the faulty device's action icon in the 'RAID Properties' screen (see figure Figure 6.38).
2. Click 'OK' to execute the deletion.

To add a new device instead of the one removed:

1. Click the action icon of the RAID device in the 'Disk Management' screen (see figure Figure 6.37).
2. The 'RAID Properties' screen appears, this time with a combo box allowing you to choose the new partition to be added (see figure Figure 6.40).

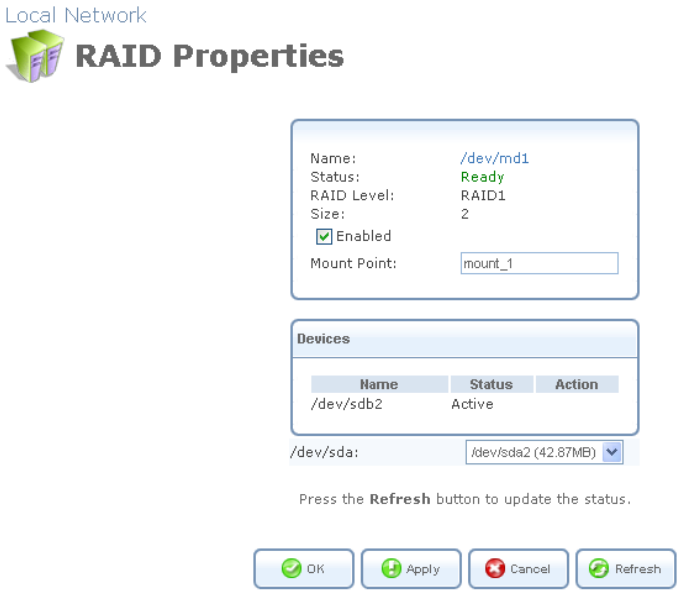


Figure 6.40. RAID Properties

3. Choose the partition and click 'OK' for the changes to take effect.

After adding a new device, RAID1 starts a recovery process in which the content of the existing partition is mirrored to the new device. If the addition or recovery fails, the device status is set to inactive (this status appears in the 'RAID Properties' screen, figure Figure 6.38). In such cases, the device should be removed and another may be added. You can manipulate your disk partitions using OpenRG's Web-based management. However, it is recommended to configure your disks before setting up RAID. Once RAID is configured, you will not be able to delete an underlying partition, or create a new partition on a disk that one of its partitions is underlying RAID, unless you disable or delete the RAID device. Changing a disk's partition table when its partitions are under RAID (even if RAID is disabled) may result in the need to reconstruct the RAID.

6.5. Shared Printers

OpenRG includes a print server that allows printers attached to OpenRG via the USB connection to be shared by all computers on the LAN. Such a printer appears on the network map, and can be managed using the WBM.

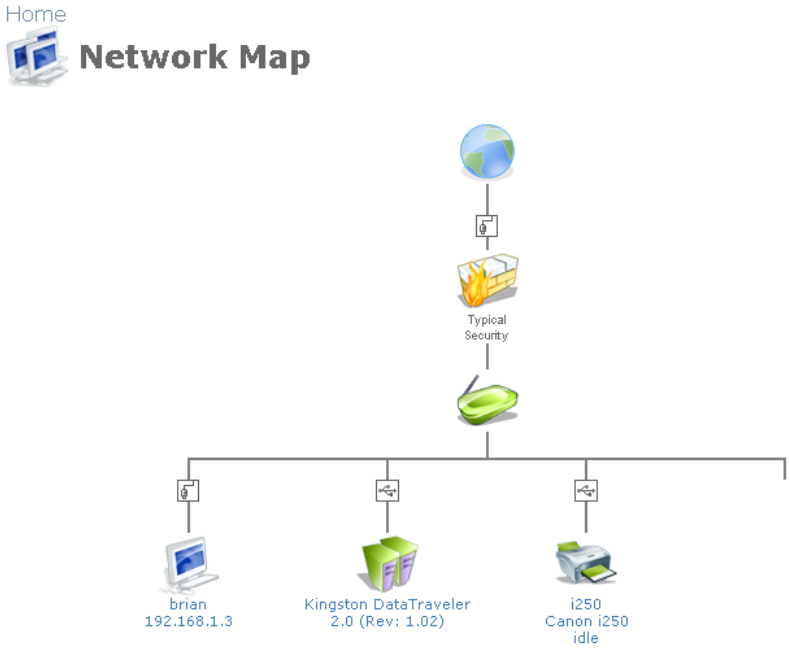


Figure 6.41. Printer on Network Map

You can access the printer settings directly by clicking the printer icon on the network map. The 'Printer' screen appears (see figure Figure 6.42), where you can view information about your printer, as well as view a list of print jobs (when in queue).

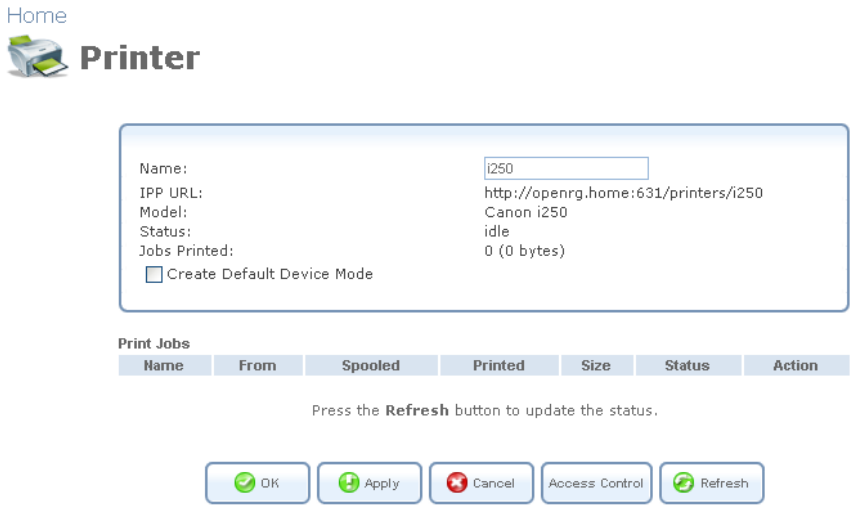


Figure 6.42. Printer Settings

Alternatively, access the 'Print Server' screen by clicking the 'Shared Printers' link under the 'Local Network' tab:

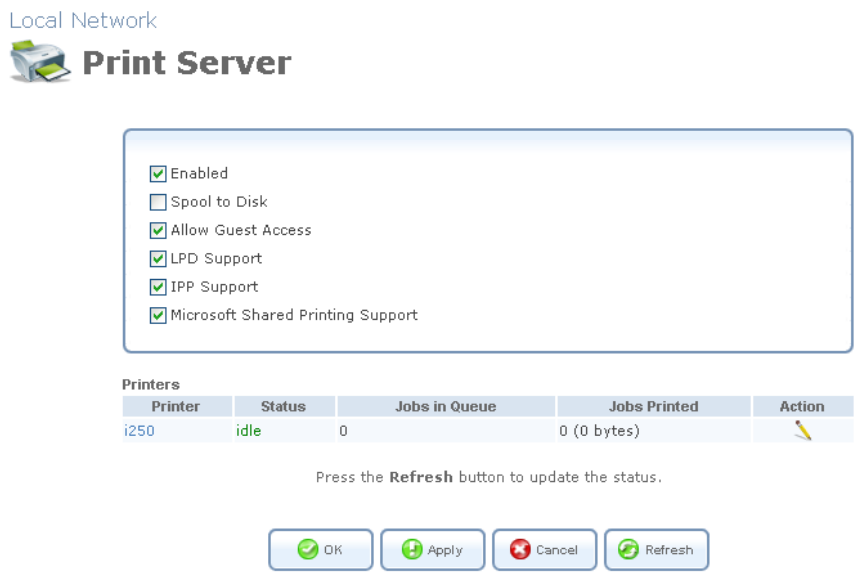


Figure 6.43. Print Server

This screen enables you to configure your print server with the following options:

Enabled Check or un-check this box to enable or disable this feature.

Spool to Disk Select this option to allow print jobs to be written to a disk before printing.

Allow Guest Access Allow network users that have not logged in with a username and password to use the shared printer.

LPD Support Enable the LPD protocol.

IPP Support Enable the IPP protocol.

Microsoft Shared Printing Support Enable the Samba protocol.

Printers This table displays OpenRG's printers, their status and print job information.
OpenRG provides three protocols for computers to connect to its printers:

1. Internet Printing Protocol (IPP) (see section Section 6.5.2) The recommended protocol is IPP, offering fast installation and ease of use.

2. Microsoft Shared Printing (Samba) (see section Section 6.5.3) The Samba protocol allows the administrator to upload Windows print drivers to OpenRG, enabling all Windows-based LAN hosts to connect to the network printer with a single click. It is advised that this protocol be set up by a technical administrator.

3. Line Printer Daemon (LPD) (see section Section 6.5.4) LPD is a legacy network printing protocol, which should only be used for printing from computers that do not support IPP.

The following table compares the specifications of these three protocols:

Specification	**IPP**	**Samba**	**LPD**
Installation	Easy	Easy	Difficult
Driver upload	None	Supported	None
Supported clients	Windows, Unix, Mac	Windows, Mac	Windows, Unix, Mac
Job feedback and control			Management console only

	Print queue monitor and management console	Print queue monitor and management console	
Printer control	Print queue monitor	None	None
Access controls	Print and administrator	Print permission only	None

Table 6.1.

Important Note For Mac Users: When connecting a print server to a Mac computer, you must verify that the printer connected to the board is supported by Mac OS as a network printer. Supported printers are marked with an "X" in the following URL: http://docs.info.apple.com/article.html?artnum=301175#hpdrivers. The scenarios in this chapter have been tested with Mac OS version 10.4.4.

6.5.1. Uploading Printer Drivers

In order to use a shared printer connected to OpenRG, a driver for the printer must be installed on the LAN computer from which the print job is to be sent. If your gateway contains a permanent storage device, you can use OpenRG's file server to store printer drivers. The drivers should be uploaded from a Windows computer and stored in the system storage area that you have created on one of the disk partitions (refer to section Section 6.4.2). The printer can then be installed on other LAN computers using the stored driver on OpenRG, by simply browsing to it and double-clicking. To upload the driver files:

1. Under Window's Start menu, click Run and type "cmd" to open a command shell.
2. Type: '`net use /del *`'.
3. Type: '`net use openrg print$ [Admin's password] [/user:admin]`'. This ensures that you are logged into the print server using the Admin user and have the permissions to upload files.
4. Browse to `openrg` . The following window appears, displaying the disk and printer shares available on OpenRG (see figure Figure 6.44).

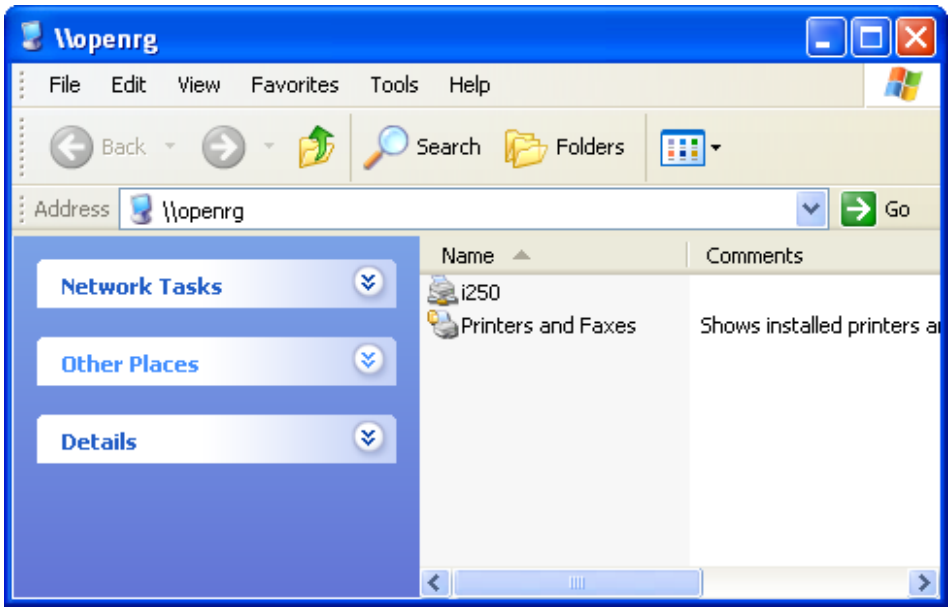


Figure 6.44. OpenRG Shares

5. Open 'Printers and Faxes'.
6. Right-click the printer icon and choose Properties.

7. If your operating system does not already have the driver, the following error appears: "The driver for the specified printer is not installed, only spooler properties will be displayed. Do you want to install the driver now?". Click 'No'.
8. Select the 'Advanced' tab.
9. Click 'New driver'. The 'Add Printer Driver Wizard on openrg' will commence.
10. Select the driver according to the manufacturer and printer model, or provide a disk that includes the driver.
11. Click 'OK'. The driver is uploaded to OpenRG's system storage area.

6.5.2. Printing with IPP

6.5.2.1. Setting Up an IPP Printer on Windows

1. Connect the printer's USB cable to OpenRG. A printer icon appears in the 'Network Map' screen.

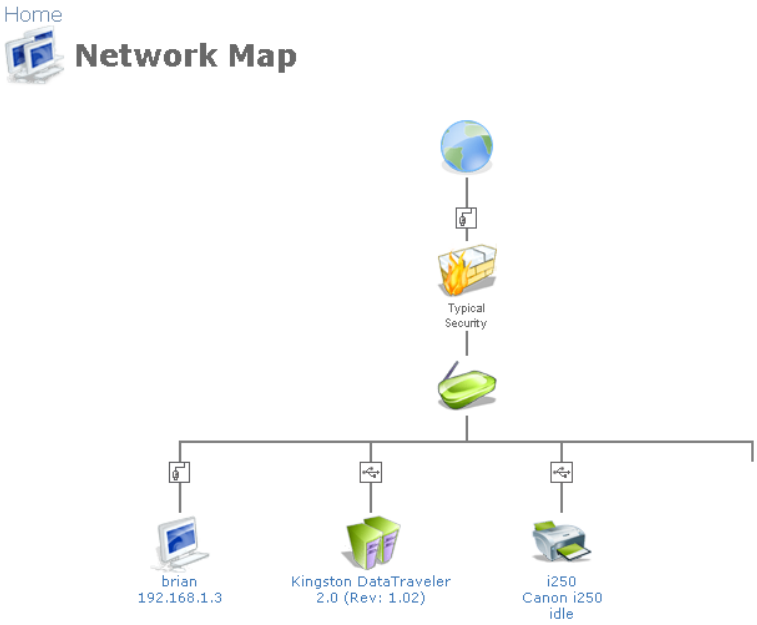


Figure 6.45. Network Map

2. Click the printer icon to view the 'Printer' screen.
3. Copy the IPP URL to the clipboard.

Figure 6.46. Printer Settings

1. On your Windows computer connected to OpenRG, open the 'Printers and Faxes' utility from the 'Settings' menu under 'Start'.

2. Click the 'Add a printer' link to activate the 'Add Printer Wizard'.

3. Click 'Next' to proceed with the wizard sequence.

4. Select 'Network Printer' and click 'Next' (see figure Figure 6.47).

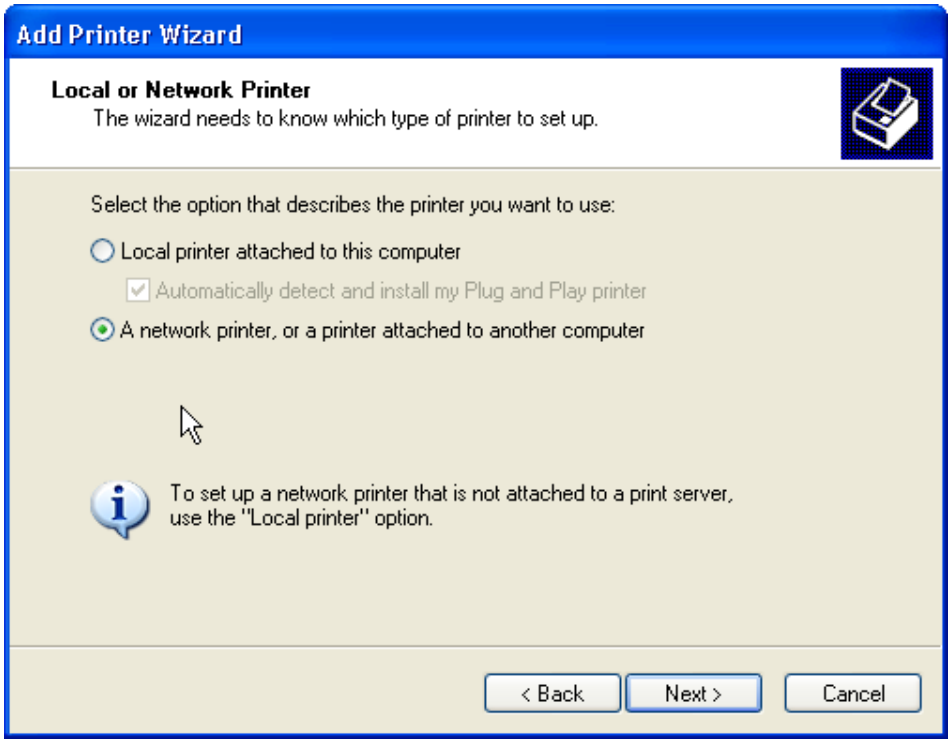

Add Printer Wizard
Local or Network Printer
The wizard needs to know which type of printer to set up.
Select the option that describes the printer you want to use:
Local printer attached to this computer
Automatically detect and install my Plug and Play printer
A network printer, or a printer attached to another computer
To set up a network printer that is not attached to a print server, use the "Local printer" option.
< Back
Next >
Cancel

Figure 6.47. Local or Network Printer

5. Select 'Connect to a printer on the Internet'.

6. Paste the printer's IPP URL in the 'URL' field (see figure Figure 6.48), and click 'Next'.

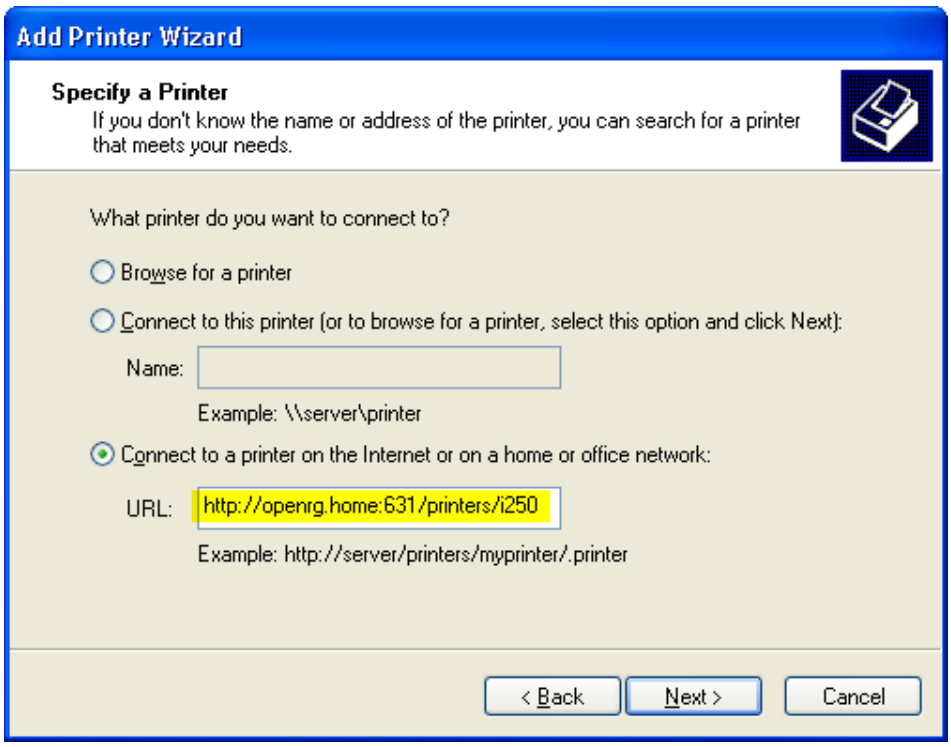

Add Printer Wizard
Specify a Printer
If you don't know the name or address of the printer, you can search for a printer that meets your needs.
What printer do you want to connect to?
Browse for a printer
Connect to this printer (or to browse for a printer, select this option and click Next):
Name:
Example: \\server\printer
Connect to a printer on the Internet or on a home or office network:
URL:
http://openrg.home:631/printers/i250
Example: http://server/printers/myprinter/.printer
< Back
Next >
Cancel

Figure 6.48. Specify a Printer

7. You may be asked to select the driver's make and model or its location. If so, please provide this information and click 'Next'.

8. Click 'Finish' to exit the wizard.

6.5.2.2. Setting Up an IPP Printer on Linux

You should use CUPS Daemon (CUPSD) when working with Linux operating systems.

1. Connect the printer's USB cable to OpenRG. A printer icon appears in the 'Network Map' screen.

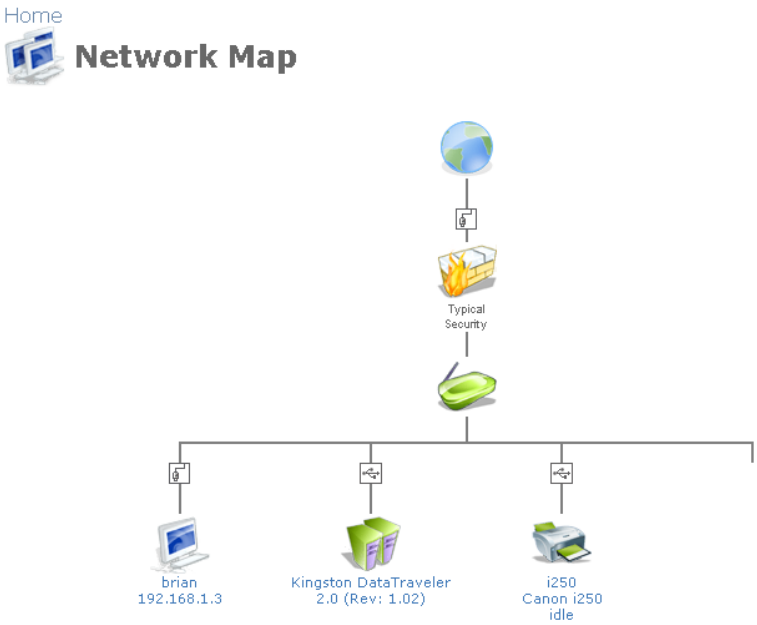


Figure 6.49. Network Map

2. Click the printer icon to view the 'Printer' screen.

3. Copy the IPP URL to the clipboard.

Figure 6.50. Printer Settings

1. On your Linux computer connected to OpenRG, browse to: `http://localhost:631` and choose the 'Manage Printers' link (see figure Figure 6.51).

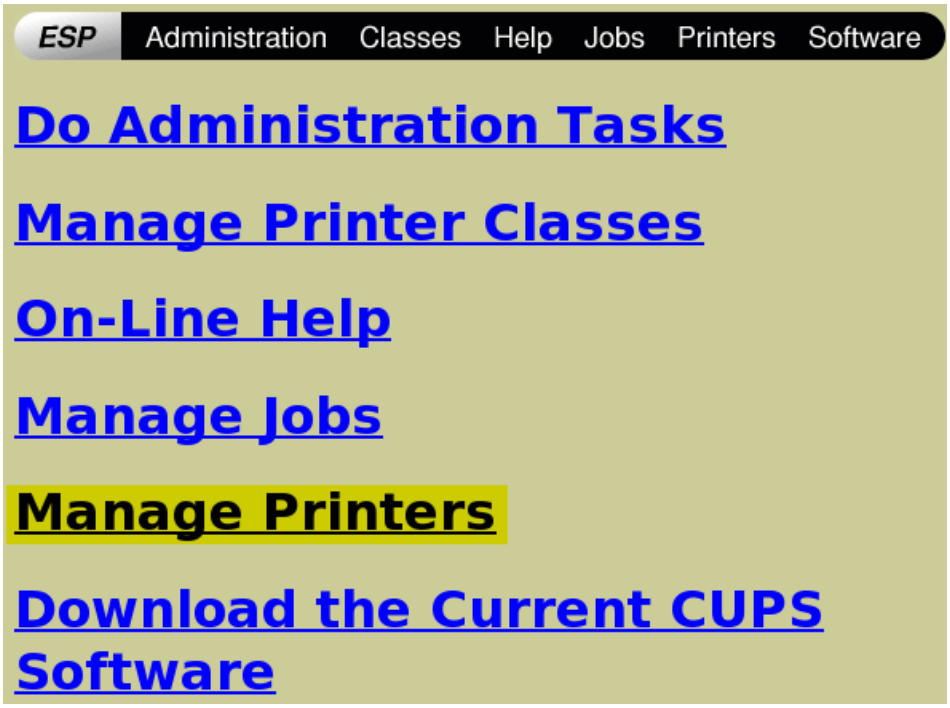


Figure 6.51. Linux CUPS Management

2. Scroll to the bottom of the page and click the 'Add Printer' link (see figure Figure 6.52).

Figure 6.52. Add Printer

3. Type the printer's name in the Name field and click 'Continue' (see figure Figure 6.53).

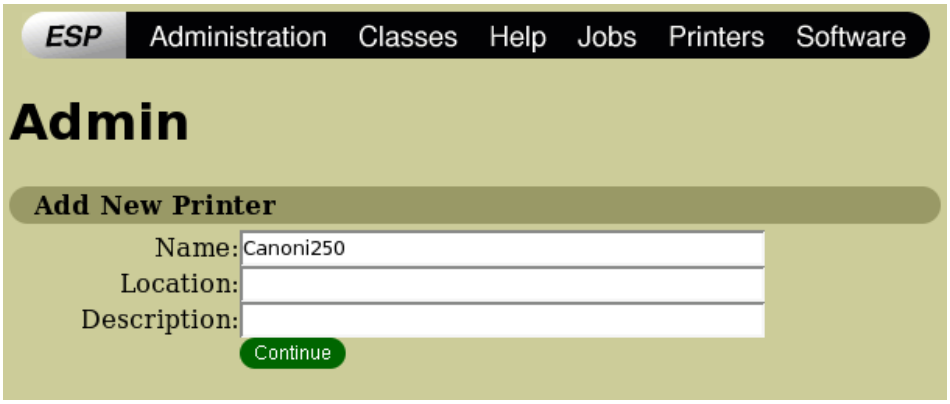


Figure 6.53. Printer Name

4. In the 'Device' combo box choose 'Internet Printing Protocol (http)' and click 'Continue' (see figure Figure 6.54).

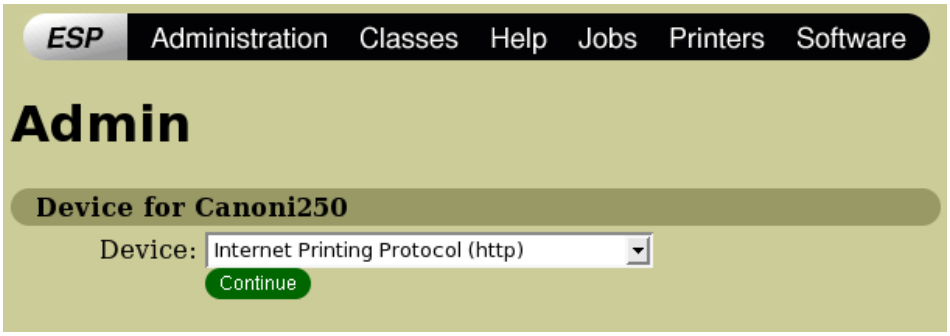


Figure 6.54. Printing Protocol

5. Paste the printer's IPP URL in the 'Device URL' field (see figure Figure 6.55) and click 'Continue'.

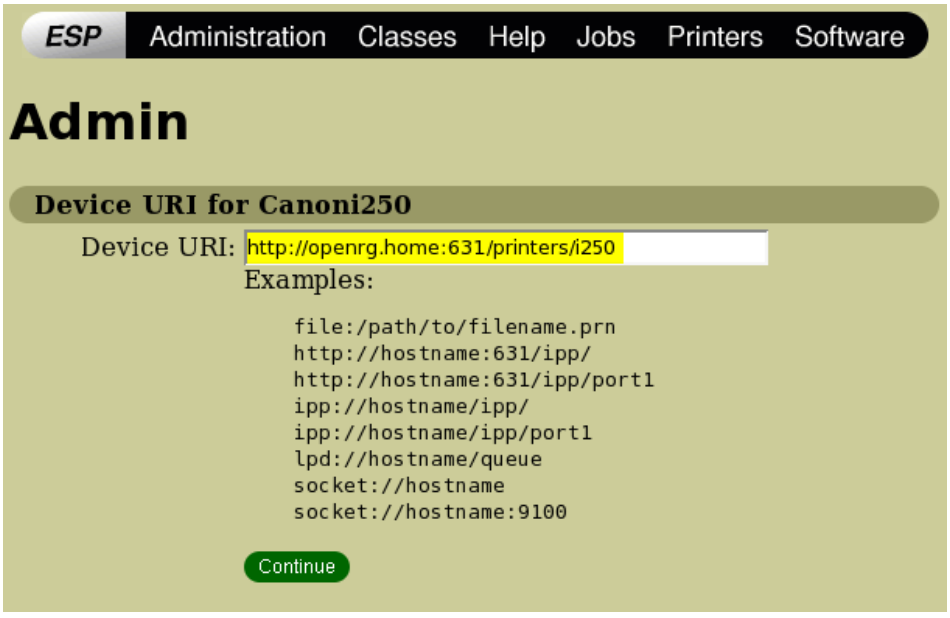


Figure 6.55. IPP URL

6. The next window will display a manufacturer combo box. Choose your printer's manufacturer and click 'Continue'.

7. The next window will display a printer model combo box. Choose your printer's model and click 'Continue'.

8. The last window will display the following confirmation message: 'Printer has been added successfully'.

9. To test your printer's connection from a Linux PC, type: $ echo hello | lpr -P<Printer Name>

6.5.2.3. Setting Up an IPP Printer on Mac

1. Connect the printer's USB cable to OpenRG. A printer icon appears in the 'Network Map' screen.

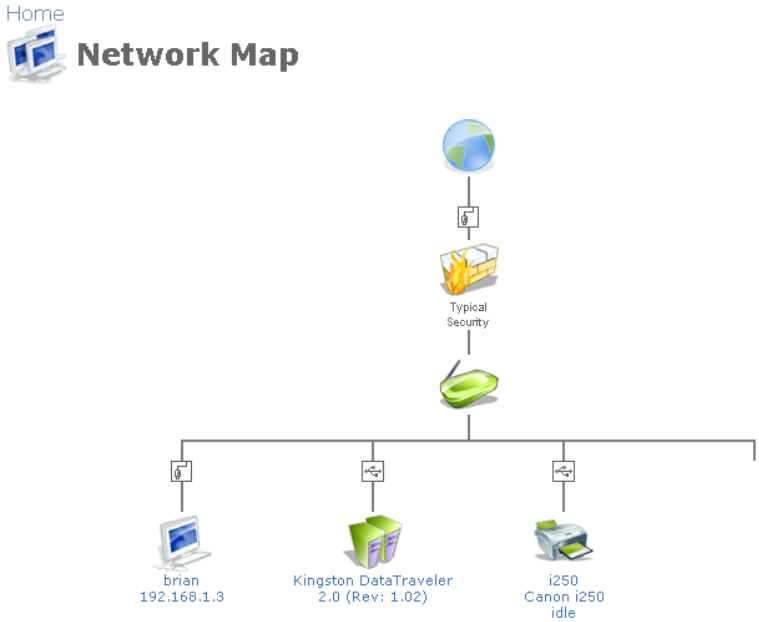


Figure 6.56. Network Map

2. On your Mac computer connected to OpenRG, open the 'Print & Fax' utility from 'System Preferences'. The 'Print & Fax' screen appears.

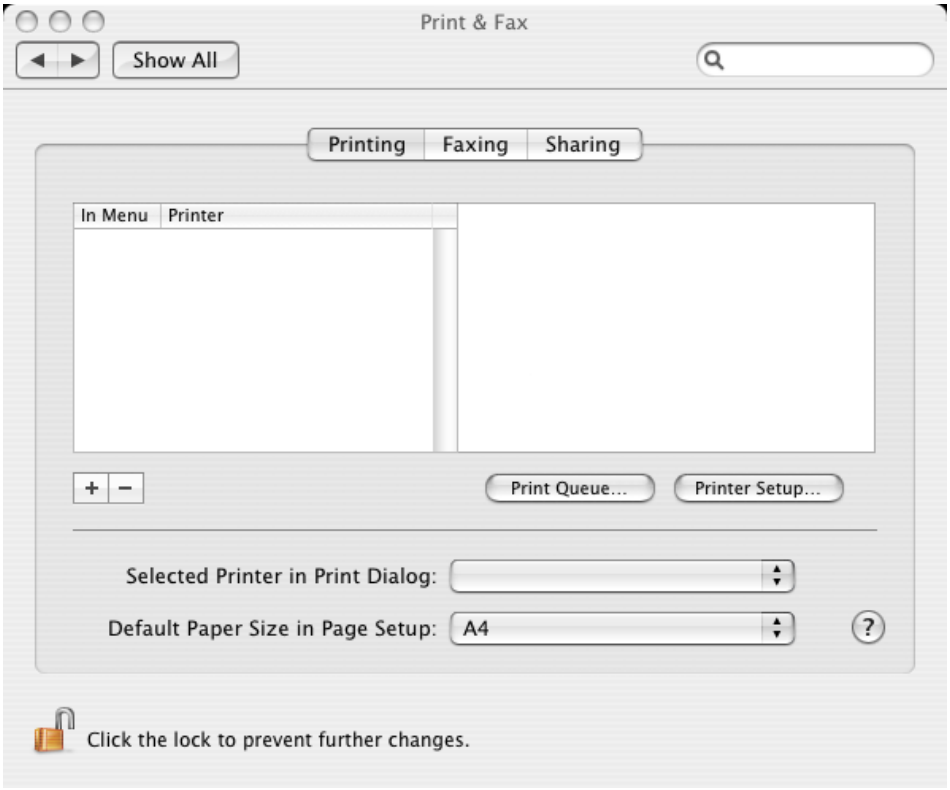


Figure 6.57. Print & Fax

1. Click the '+' (add) button. The 'Printer Browser' screen appears. Select its 'IP Printer' tab.
2. In this screen, configure the following:
    1. In the 'Protocol' drop-down list, select IPP.
    2. In the 'Address' field, enter OpenRG's IP address (192.168.1.1).
    3. In the 'Queue' field, enter the section of the path containing the folder and printer names, as it appears in the 'Printer' screen of the WBM (see figure Figure 6.42). For example, **/printers/MFC9750** .
    4. The 'Name' and 'Location' fields are optional; the default name is the gateway's IP address.
    5. In the 'Print Using' drop-down list, select your printer's make and model.

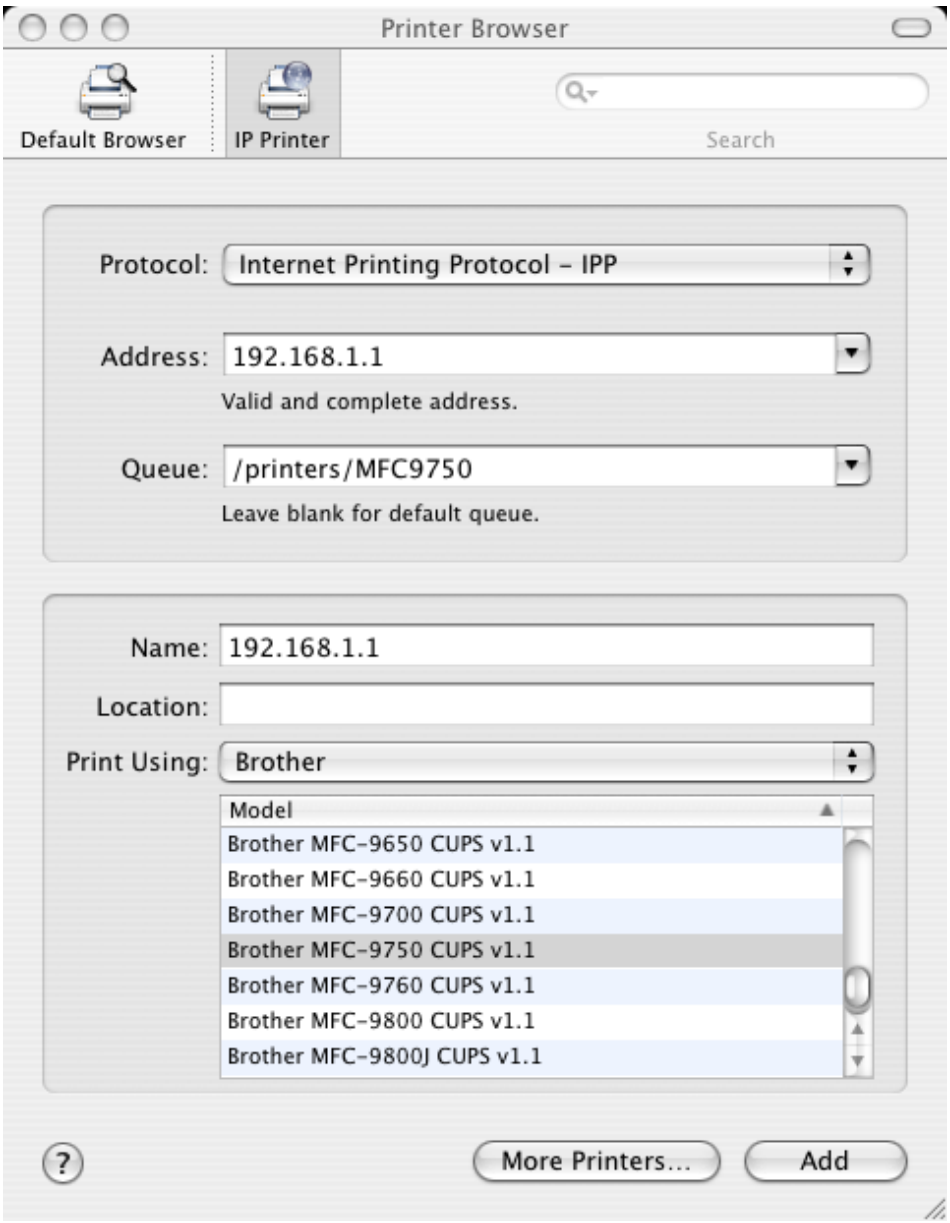


Figure 6.58. Printer Browser -- IP Printer

3. Click the 'Add' button. The new printer appears in the 'Print & Fax' screen.

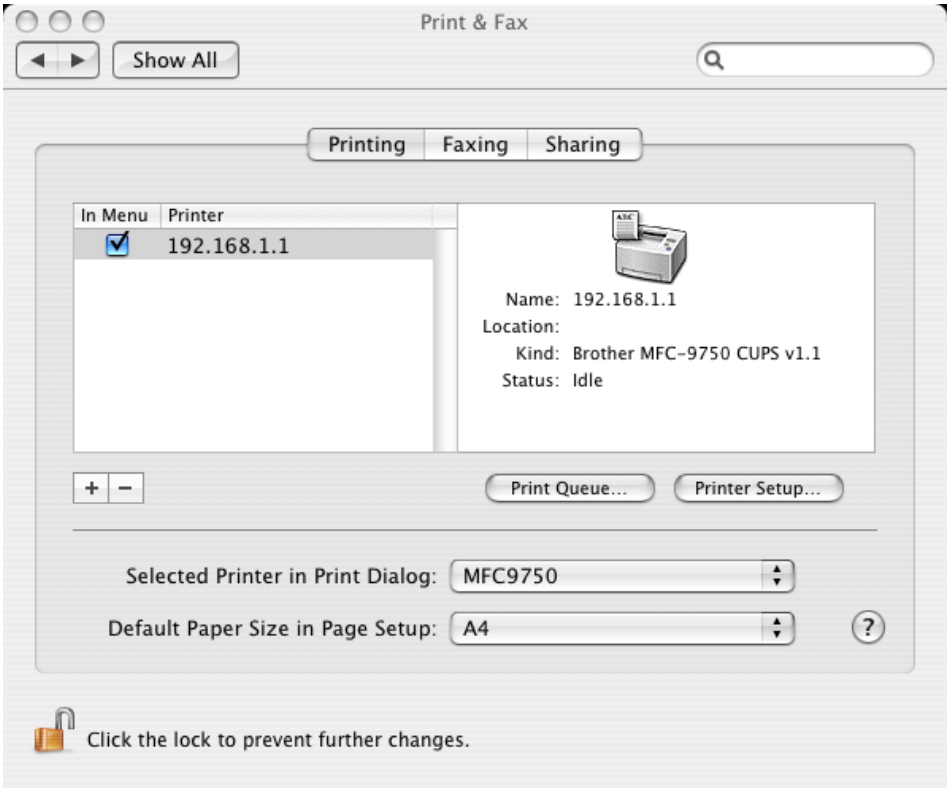


Figure 6.59. Print & Fax -- New IPP Printer

6.5.2.4. Using the Windows Print Queue Monitor

The Windows print queue monitor displays all queued print jobs in a print queue, including jobs submitted by other users and jobs sent via LPD and Samba printing protocols.

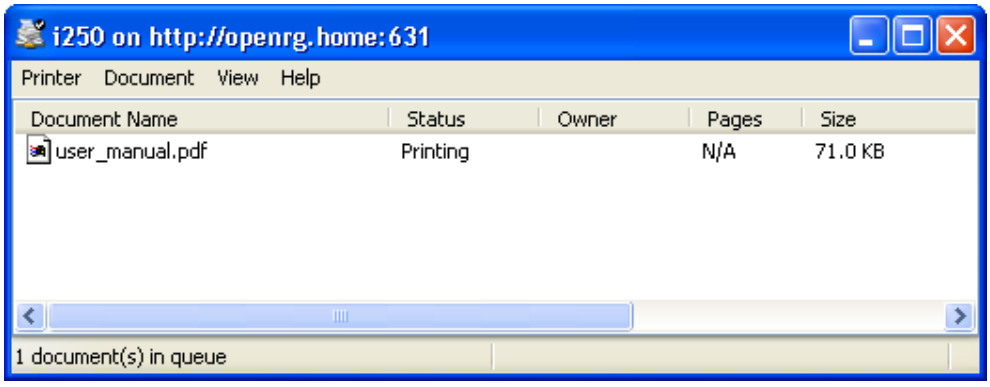


Figure 6.60. Print Queue Monitor

The print queue monitor allows users to delete print jobs or pause and resume the print queue by default. However, if Guest Access is disabled, only users with administrator permissions may perform these actions. Low-end printer models may malfunction if a partially printed job is deleted. Should this happen, please reset the printer manually by switching it off and then on again.

6.5.2.5. Accessing Controls on IPP Printers

IPP supports controlled access to printers (this is currently only supported by Windows XP). IPP printers can work in two modes:

1. Guest Access: all users on the LAN can print, delete, pause and resume all printer jobs.
2. Non-Guest Access: the OpenRG administrator can configure each printer with two types of users:
    1. Users with print access can print, delete, pause and resume their print jobs only.
    2. Users with administrator permissions can also perform these tasks on other users' jobs, as well as pause and resume the printer.

In order to enable access controls, you need to:

1. Access this feature either from the 'Shared Printers' tab under the 'Local Network' screen, or by clicking its icon in the 'Advanced' screen. The 'Print Server' screen appears.
2. Deselect the 'Allow Guest Access' option (see figure Figure 6.61).

Figure 6.61. Print Server

3. Click 'OK' to save the change and be navigated back to the 'Advanced' screen.
4. Click the 'Users' icon. The Users screen appears:

Figure 6.62. Users

5. Click the name of the user whom you wish to grant the access.
6. In the 'User Settings' screen that appears, check the 'Internet Printer Access' check box in the Permissions section (see figure Figure 6.63).

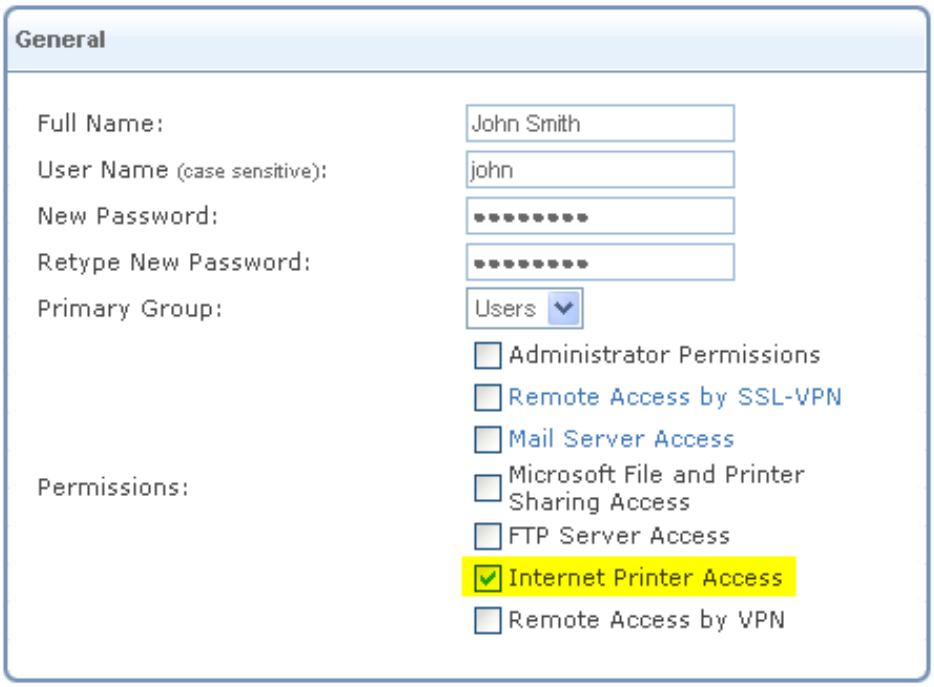


Figure 6.63. User Settings

7. Click 'OK' to save the settings.

8. Add the user to the 'Printer Access Control' screen:

   1. Click the 'Map View' tab under 'Home' to display the Network Map (see figure Figure 6.41).

   2. Click the printer icon to view the 'Printer' screen (see figure Figure 6.64).

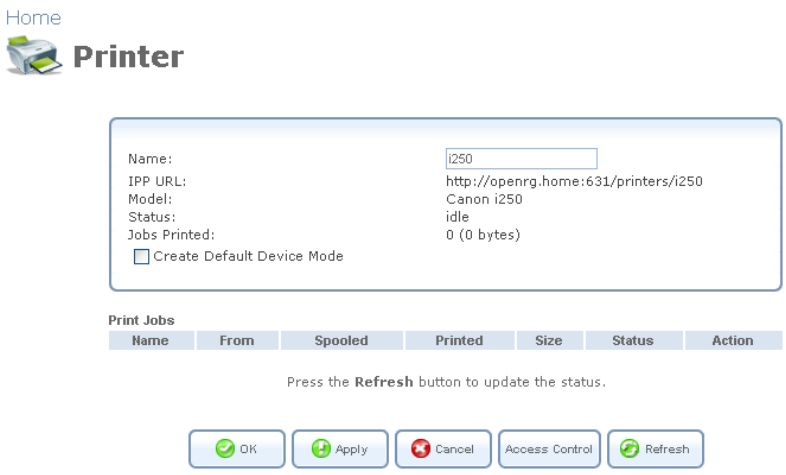


Figure 6.64. Printer Settings

   3. Press the 'Access Control' button to open the 'Printer Access Control' screen (see figure Figure 6.65).

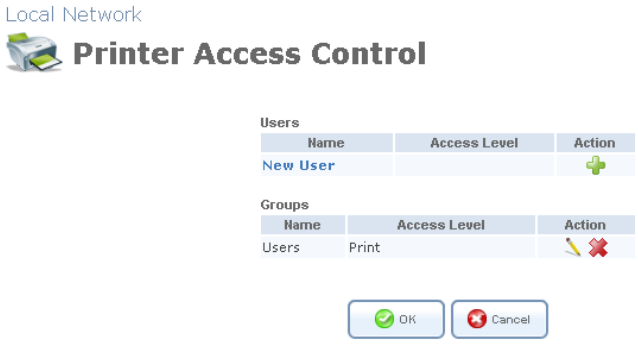


Figure 6.65. Printer Access Control

4. Click the 'New User' link to select the user and the access level (Print/Admin) (see figure Figure 6.66).

Figure 6.66. User Access Level

9. Click 'OK' to return to the 'Printer Access Control' screen.

10. Click 'OK' to save the settings.

When installing an IPP printer, the user is prompted for a username and a password, which will be used for all printing operations. If you disable 'Allow Guest Printing' on OpenRG after the printer was installed on Windows, it will no longer be available and will have to be re-installed.

6.5.2.6. Troubleshooting

- The printer does not respond to printing requests.

  1. Ensure that the print server is enabled: click the "Print Server" icon under "Advanced" in the management console. The first option, "Enabled" should be checked.

  2. The management console screen should show diagnostic information for printer and jobs.

  3. Restart the printer.

6.5.3. Printing with Samba

6.5.3.1. Setting Up a Samba Printer on Windows

Before configuring the Samba protocol on a LAN PC, please ensure that a print driver for the specific printer is installed.

Note: The following configuration must be applied to each LAN PC individually in order to use the network printer.

1. Once logged in to OpenRG, browse to `openrg` . The disk and printer shares window appears (see figure Figure 6.44).

2. Click the icon of the printer you would like to designate as a LAN printer. The following warning appears:

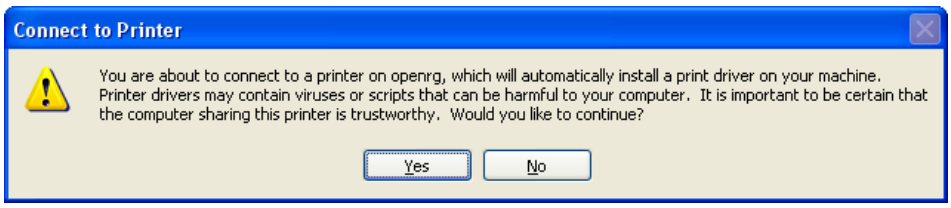

Connect to Printer
You are about to connect to a printer on openrg, which will automatically install a print driver on your machine. Printer drivers may contain viruses or scripts that can be harmful to your computer. It is important to be certain that the computer sharing this printer is trustworthy. Would you like to continue?
Yes
No

Figure 6.67. Connect to Printer Warning

3. Click "Yes". If a print driver is not available, you will be prompted to choose one from a list. Otherwise, the printer's print queue window appears (see figure Figure 6.68), determining that the printer is ready for use.

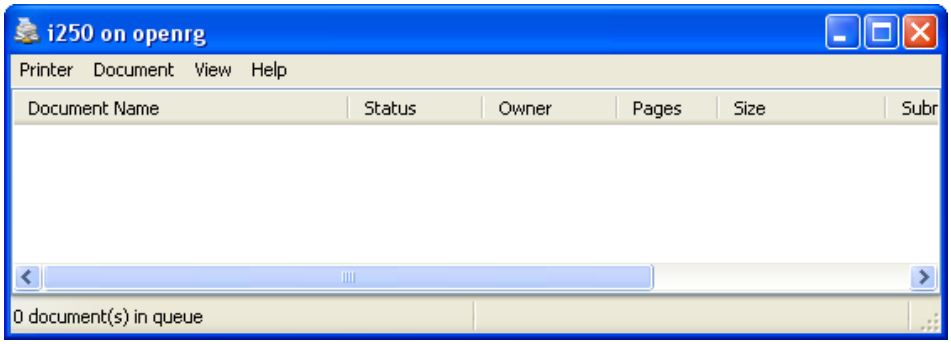


Figure 6.68. Printer Queue

6.5.3.2. Setting Up a Samba Printer on Mac

1. Connect the printer's USB cable to OpenRG. A printer icon appears in the 'Network Map' screen.

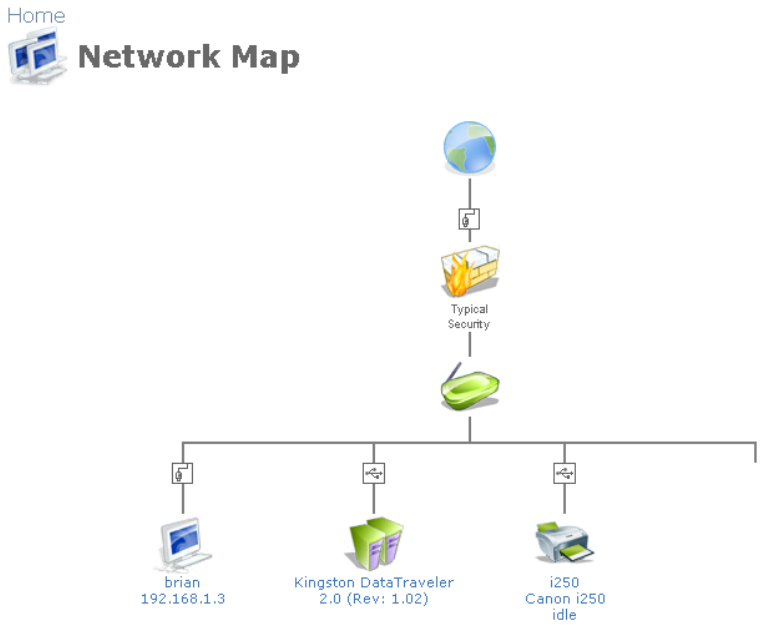


Figure 6.69. Network Map

2. On your Mac computer connected to OpenRG, open the 'Print & Fax' utility from 'System Preferences'. The 'Print & Fax' screen appears.

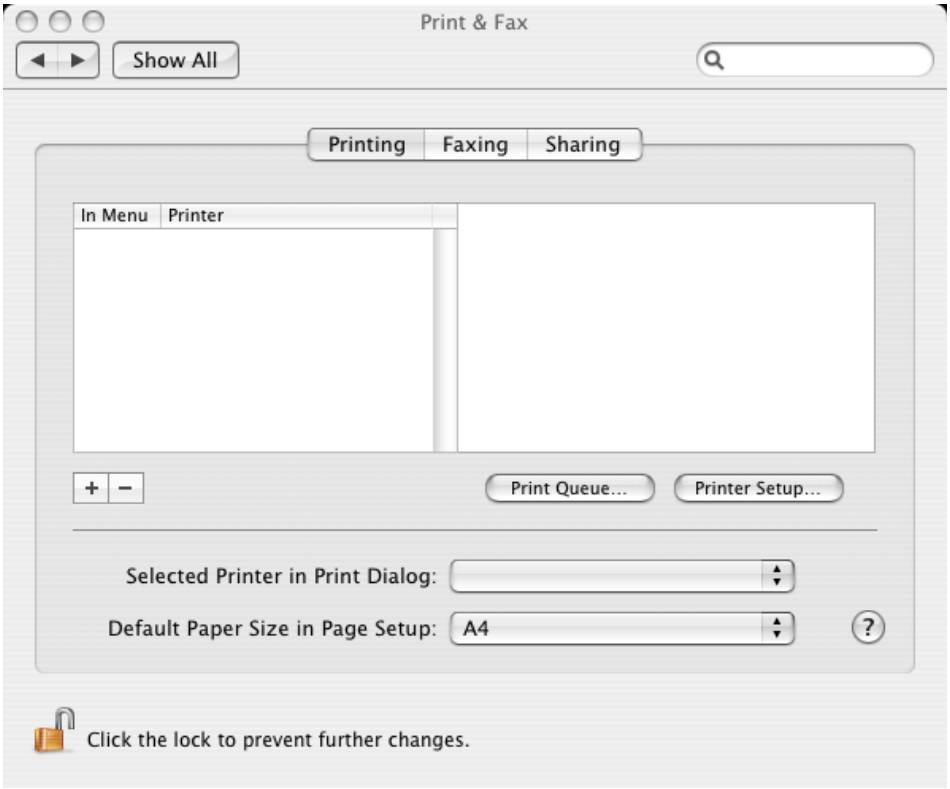


Figure 6.70. Print & Fax

1. Click the '+' (add) button. The 'Printer Browser' screen appears.

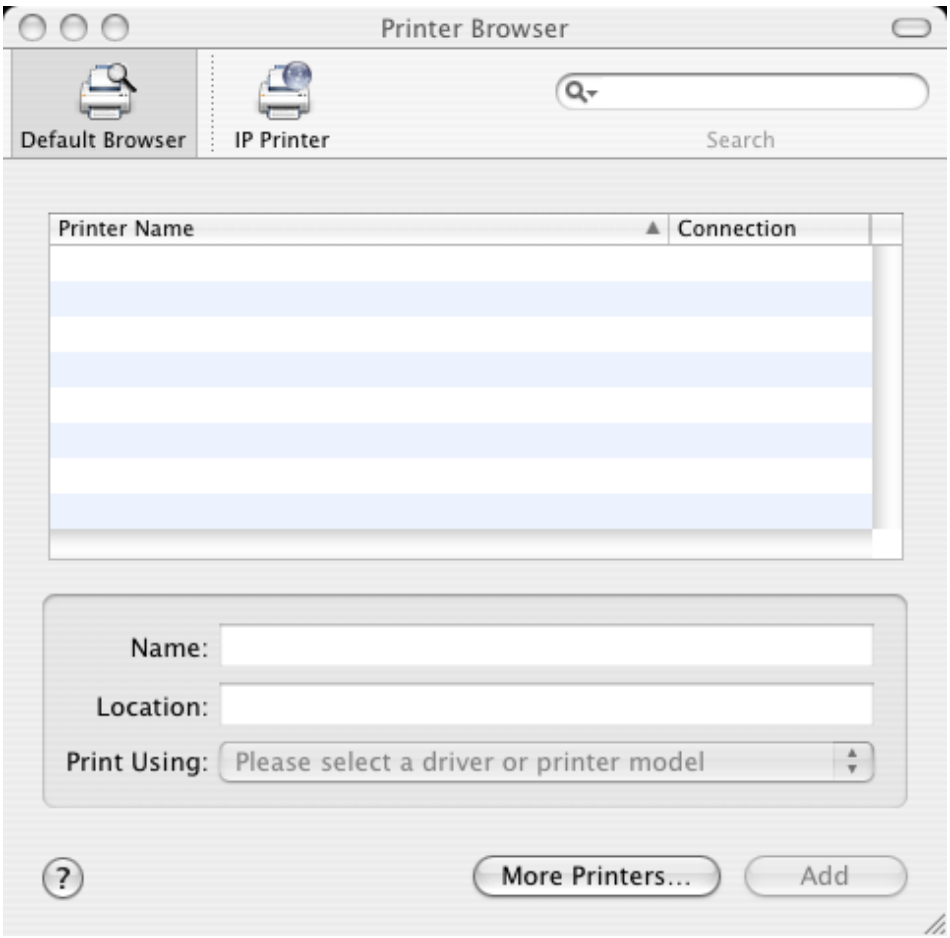


Figure 6.71. Printer Browser -- Default Browser

2. Click the 'More Printers...' button. The following screen appears.

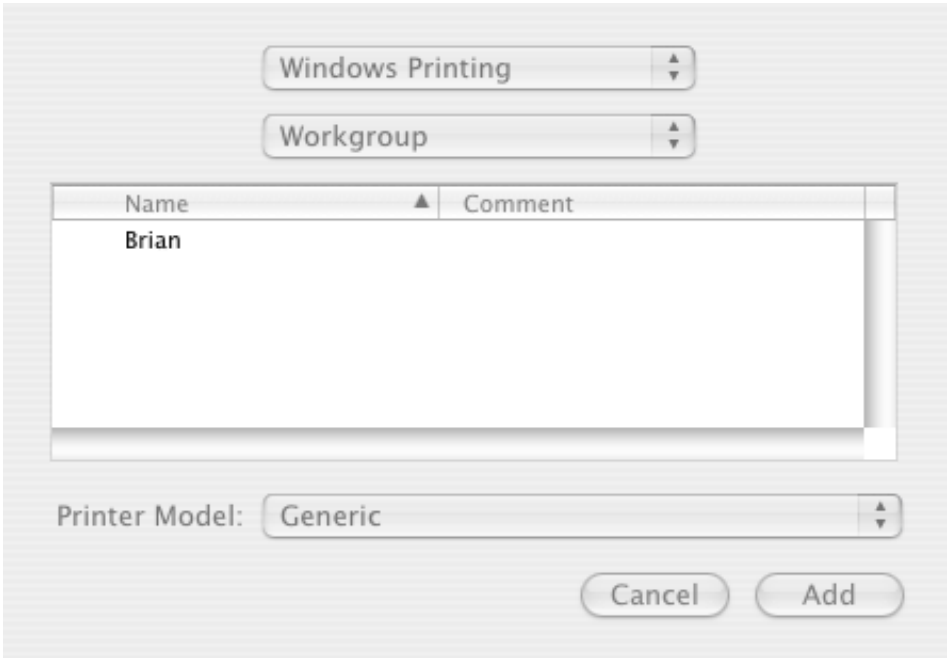


Figure 6.72. Printer Browser -- More Printers

3. In the second drop-down list, select 'Network Neighborhood'.

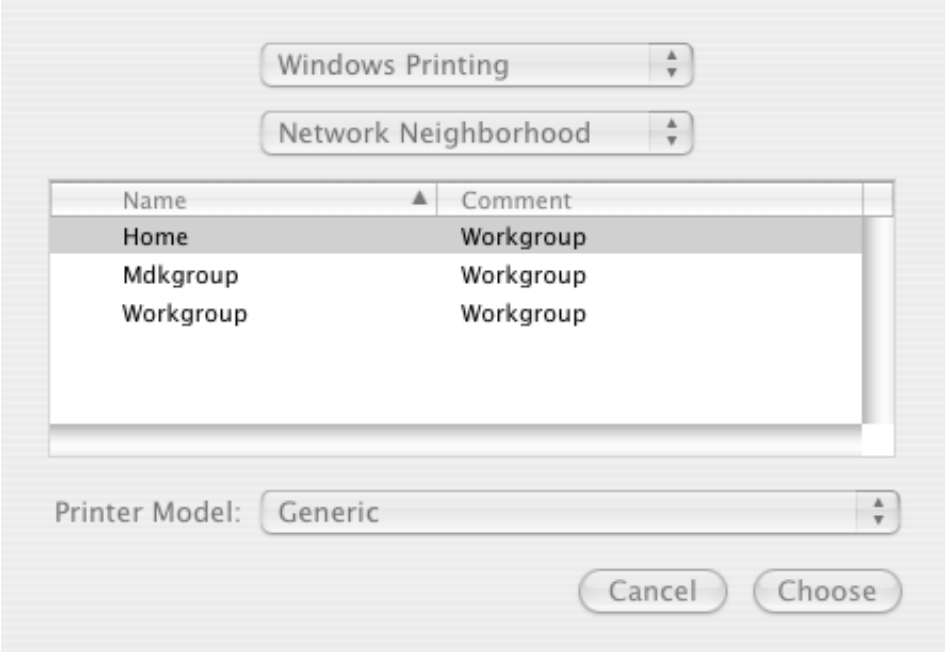


Figure 6.73. Printer Browser -- Network Neighborhood

4. Select the 'Home' workgroup and click 'Choose'.

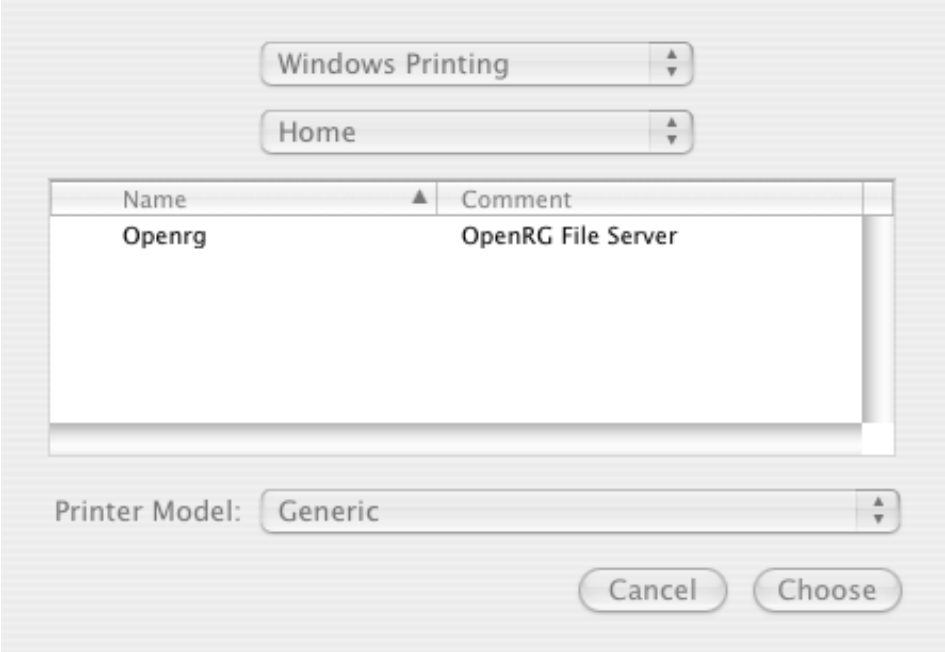


Figure 6.74. Printer Browser -- Home

5. Select OpenRG and click 'Choose'.

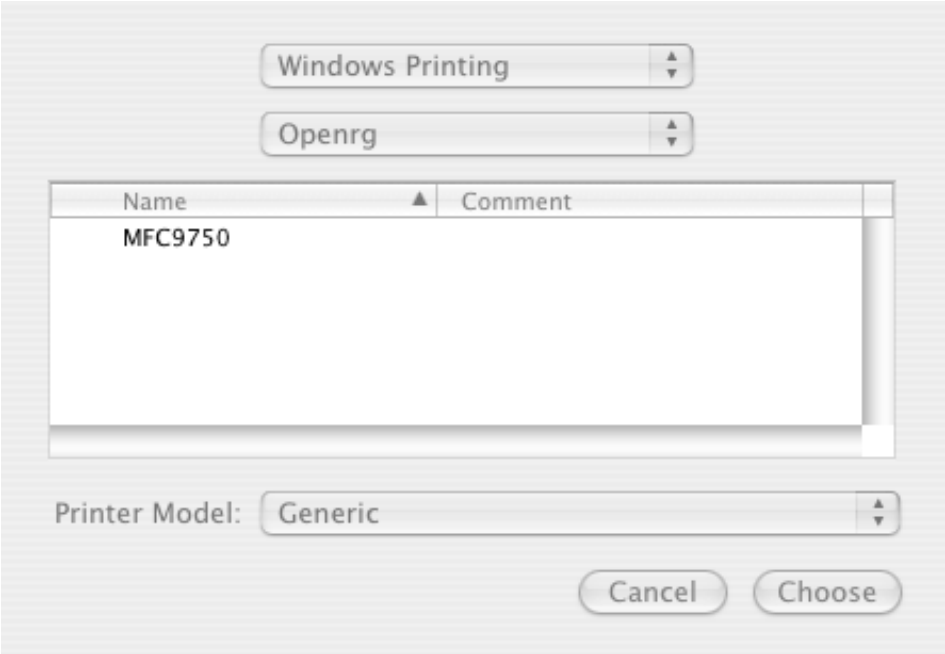


Figure 6.75. Printer Browser -- OpenRG

6. Select the printer, and in the 'Printer Model' drop-down list, select your printer's make and model.

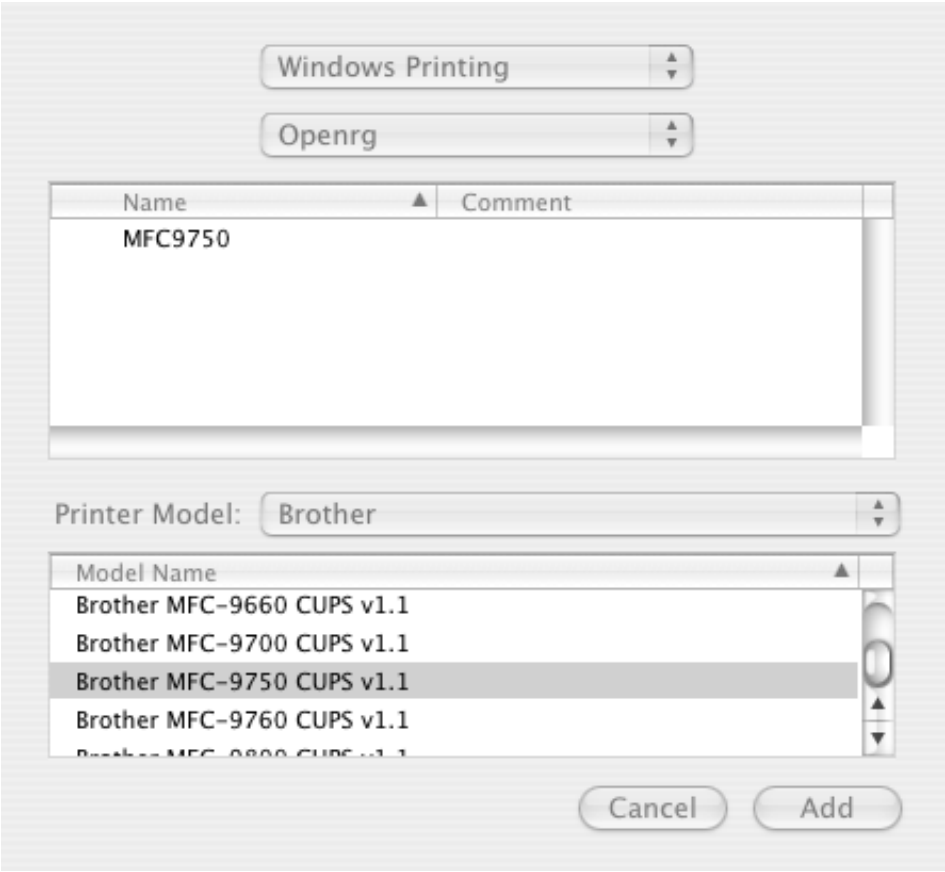


Figure 6.76. Printer Browser -- Printer Model

7. Click the 'Add' button. The new printer appears in the 'Print & Fax' screen.

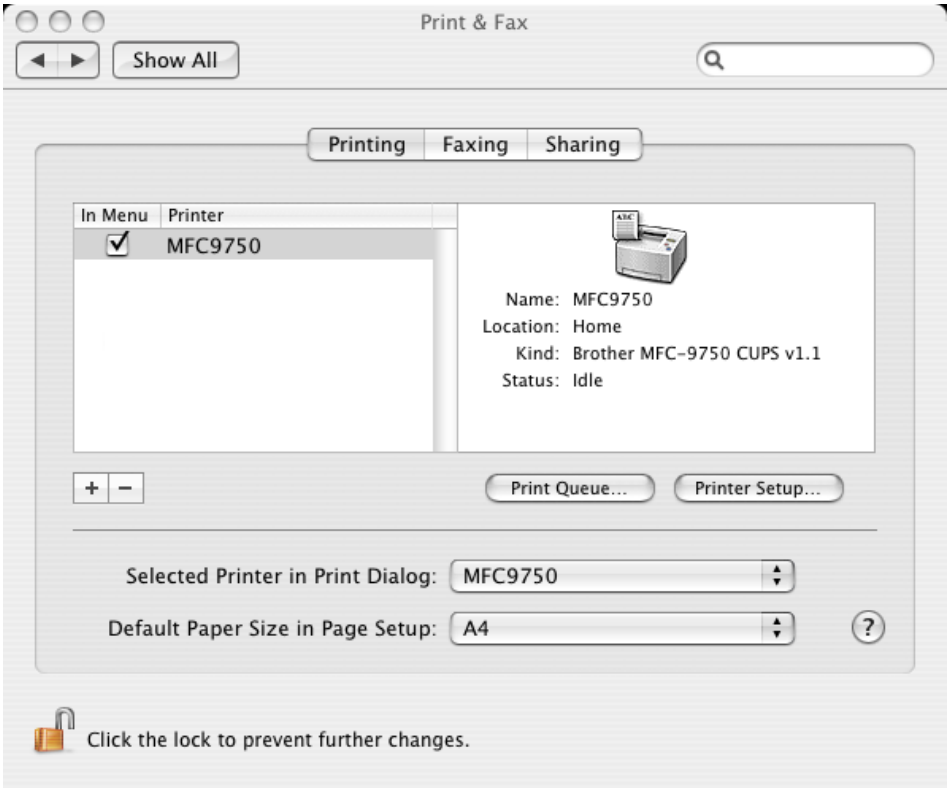


Figure 6.77. Print & Fax -- New Samba Printer

6.5.3.3. Troubleshooting

- The printer does not respond to printing requests.

  1. Ensure that the print server is enabled: click the "Print Server" icon under "Advanced" in the management console. The first option, "Enabled" should be checked.

  2. The management console screen should show diagnostic information for printer and jobs.

  3. Restart the printer.

- When trying to access the properties page of the printer from Windows, the following error message appears: "Function address 0xXXXXXXXX caused a protection fault (exception code 0xc0000005). Some or all property page(s) may not be displayed."

  1. This message appears in some cases, for example when using the HP DeskJet 3550 printer. It indicates that the printer driver does not have a default device mode and the print server should create one for it. To solve the problem, please take the following steps:

     1. Delete the printer drivers from Windows.

     2. In the management console, browse to the printer screen and check the 'Create Default Device Mode' option.

     3. Log off or reboot Windows.

     4. Try to reinstall the shared printer. It will obtain the default properties from the print server.

- Windows/Internet Explorer crashes since printer driver was installed.

1. Most problems with serving printer drivers for Windows NT/2000/XP clients are associated with the generated device mode. Certain drivers may cause { Explorer.exe} to crash with a NULL { devmode}. However, other printer drivers can cause the client's spooler service ({ spoolsv.exe}) not to operate if the { devmode} was not created by the driver itself (i.e. OpenRG generates a default { devmode}).

2. The default { devmode} parameter should be used with care and tested with the printer driver in question. It is better to leave the device mode to NULL and let Windows set the correct values. Since drivers seldom do this, setting default { devmode=yes} will instruct OpenRG to generate a default one.

3. When OpenRG is serving printer drivers for Windows NT/2000/XP clients, each printer on the Samba server has a device mode defining settings such as paper size, orientation and duplex settings. The device mode can only be generated correctly by the printer driver itself (which can only be executed on a Win32 platform). Because OpenRG is unable to execute the driver code to generate the device mode, the default behavior is not to enable the creation of a default device mode.

6.5.4. Printing with LPD

6.5.4.1. Setting Up an LPD Printer on Windows

Before configuring the LPD protocol on a LAN PC, please ensure that a print driver for the specific printer is installed.

Note: The following configuration must be applied to each LAN PC individually in order to use the network printer.

1. Open the 'Printers and Faxes' utility from the 'Settings' menu under 'Start'.

2. Click the 'Add a printer' link to activate the 'Add Printer Wizard'.

3. Click 'Next' to proceed with the wizard sequence.

4. Select 'Local printer attached to this computer'.

5. Deselect 'Automatically detect and install my Plug and Play printer', and press the 'Next' button (see figure Figure 6.78).

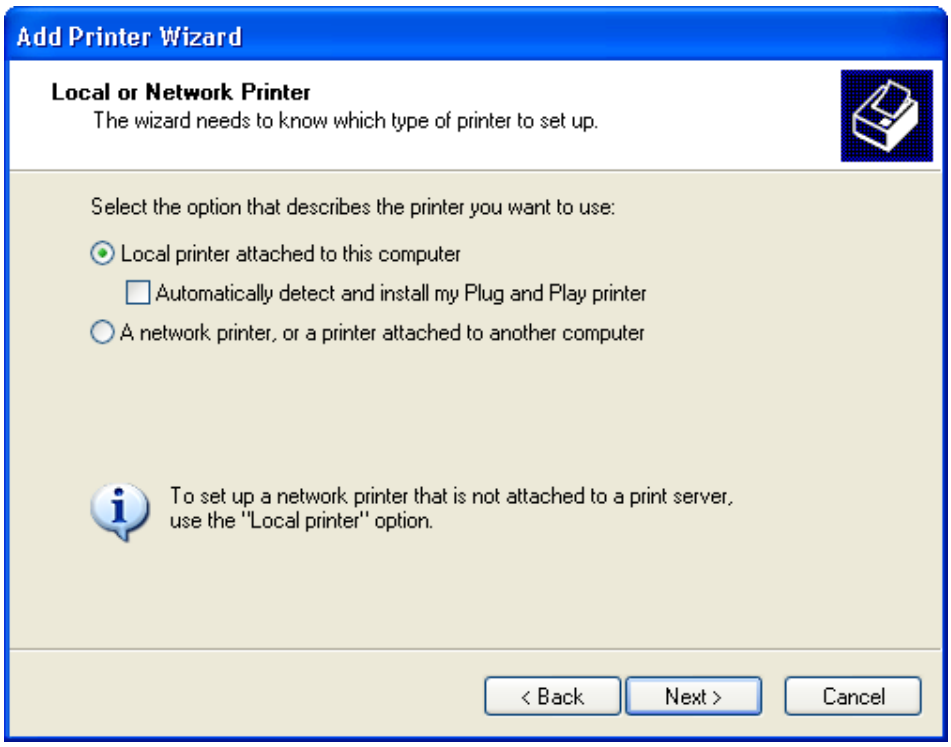

Add Printer Wizard
Local or Network Printer
The wizard needs to know which type of printer to set up.
Select the option that describes the printer you want to use:
Local printer attached to this computer
Automatically detect and install my Plug and Play printer
A network printer, or a printer attached to another computer
To set up a network printer that is not attached to a print server, use the "Local printer" option.
< Back
Next >
Cancel

Figure 6.78. Local or Network Printer

6. In the 'Select a Printer Port' screen, select the 'Create a new port' radio button (see figure Figure 6.79).

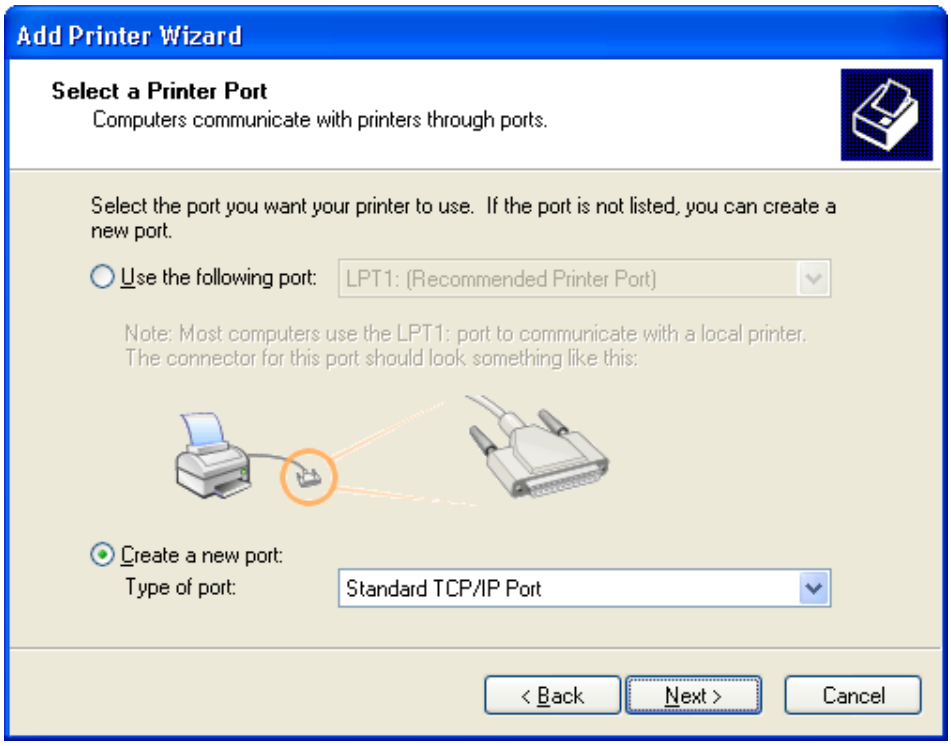

Add Printer Wizard
Select a Printer Port
Computers communicate with printers through ports.
Select the port you want your printer to use. If the port is not listed, you can create a new port.
Use the following port:
LPT1: (Recommended Printer Port)
Note: Most computers use the LPT1: port to communicate with a local printer. The connector for this port should look something like this:
Create a new port:
Type of port:
Standard TCP/IP Port
< Back
Next >
Cancel

Figure 6.79. Select a Printer Port

7. Select 'Standard TCP/IP Port' from the 'Type of port' combo box.

8. Click 'Next' to activate the 'Add Standard TCP/IP Printer Port Wizard'.

9. Click 'Next' to proceed with the new wizard.

10. Specify 192.168.1.1 in the 'Printer Name or IP Address' field (see figure Figure 6.80), and press the 'Next' button.

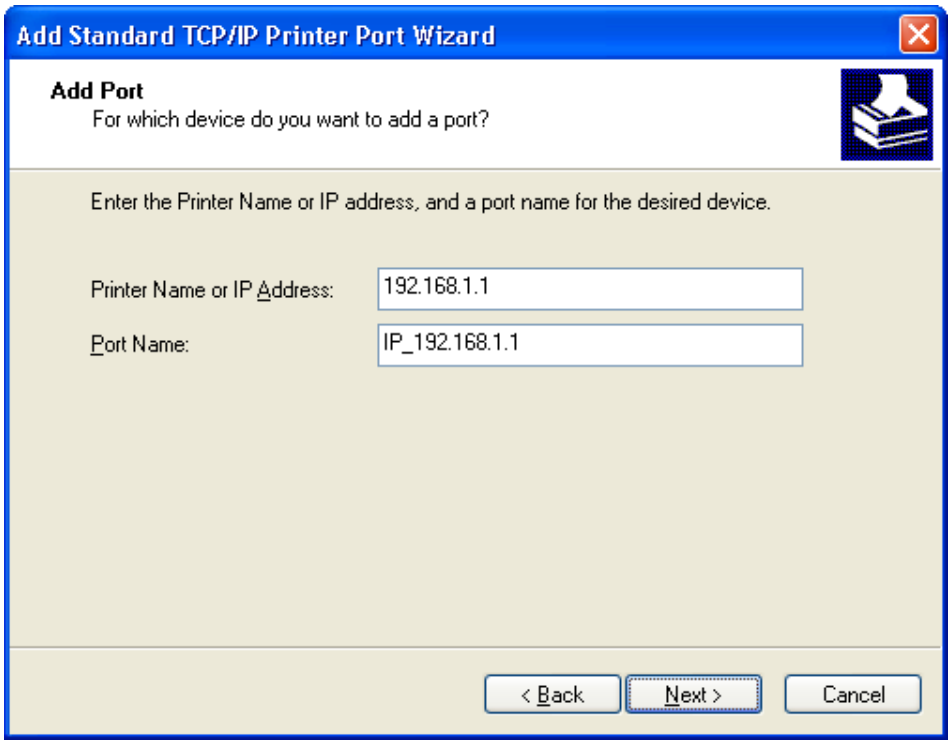

Add Standard TCP/IP Printer Port Wizard
Add Port
For which device do you want to add a port?
Enter the Printer Name or IP address, and a port name for the desired device.
Printer Name or IP Address:
192.168.1.1
Port Name:
IP_192.168.1.1
< Back
Next >
Cancel

Figure 6.80. Add Port

11. Select the 'Custom' radio button, and press the 'Settings' button (see figure Figure 6.81).

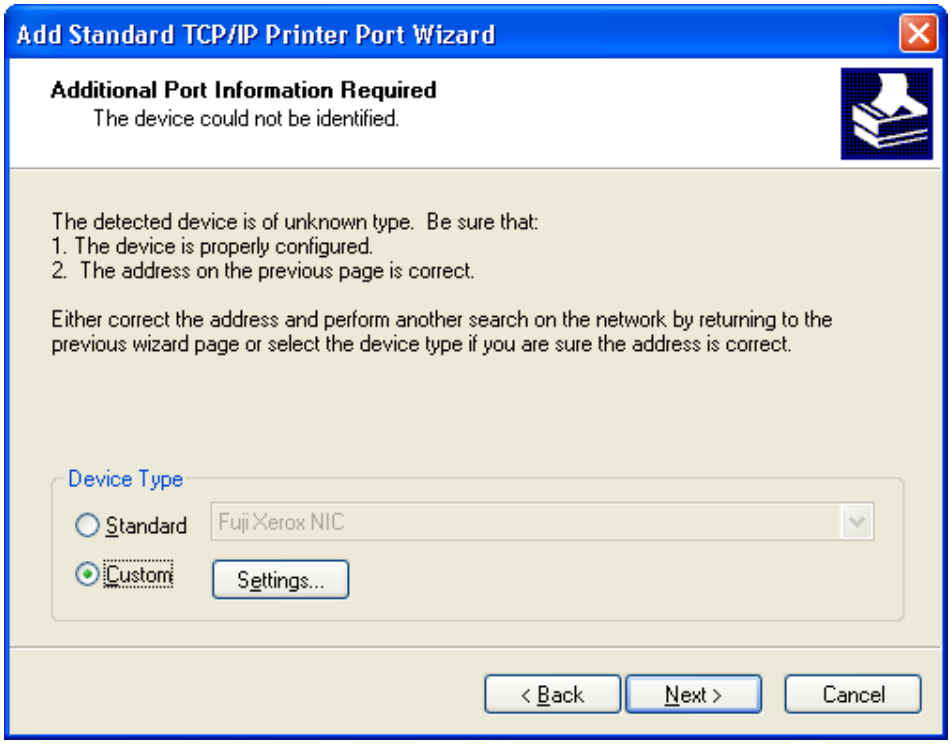

Add Standard TCP/IP Printer Port Wizard
Additional Port Information Required
The device could not be identified.
The detected device is of unknown type. Be sure that:
1. The device is properly configured.
2. The address on the previous page is correct.
Either correct the address and perform another search on the network by returning to the previous wizard page or select the device type if you are sure the address is correct.
Device Type
Standard
Fuji Xerox NIC
Custom
Settings...
< Back
Next >
Cancel

Figure 6.81. Additional Port Information

12. In the 'Configure Standard TCP/IP Port Monitor' window that appears (see figure Figure 6.82), configure the following parameters:

    - Select the 'LPR' radio button.
    - In the OpenRG's management console, click the printer icon on the network map screen to view the 'Printer' screen (see figure Figure 6.42).
    - Copy the printer's name (for example "i250") and paste it in the 'Queue Name' field of the port monitor configuration window.

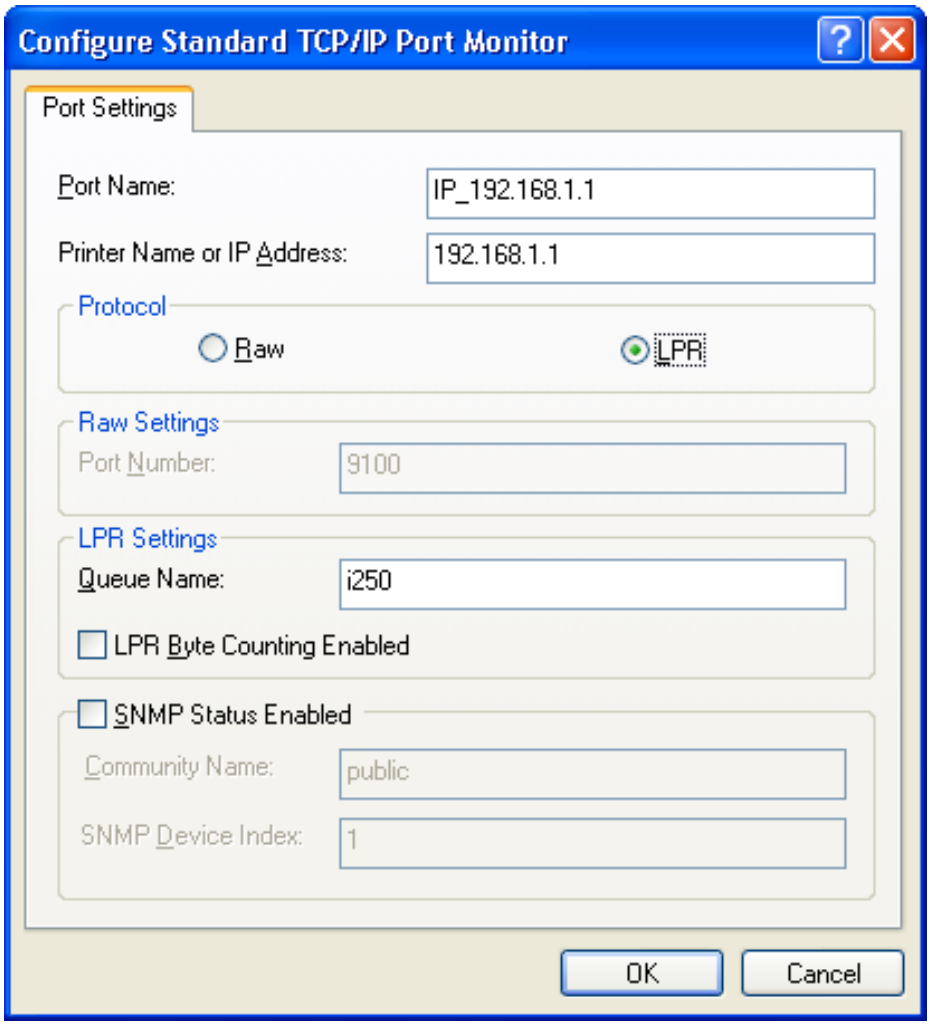


Figure 6.82. Printer Port Monitor Configuration

13. Click 'OK' to proceed.

14. Press the 'Finish' button. The 'Add Printer Software' wizard will reappear (see figure Figure 6.83).

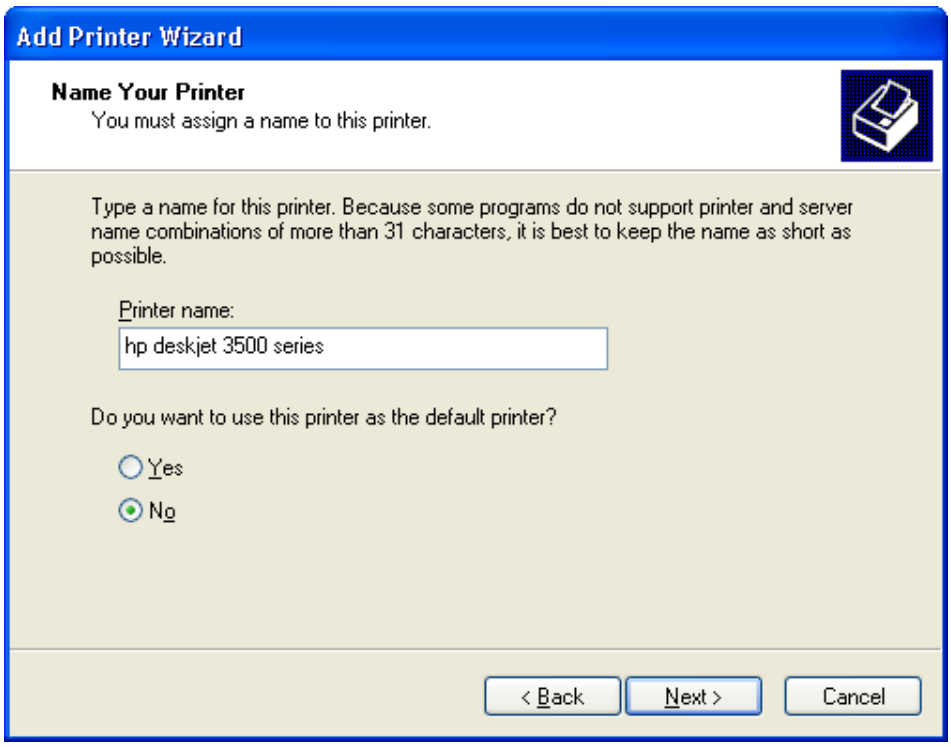

Add Printer Wizard
Name Your Printer
You must assign a name to this printer.
Type a name for this printer. Because some programs do not support printer and server name combinations of more than 31 characters, it is best to keep the name as short as possible.
Printer name:
hp deskjet 3500 series
Do you want to use this printer as the default printer?
Yes
No
< Back
Next >
Cancel

Figure 6.83. Add Printer Wizard

15. Select your printer manufacturer and model from the lists. If it does not appear in the lists, click 'Have disk' to specify driver location.

16. Specify the name you want to give the printer, and whether you want it to be the default printer (see figure Figure 6.84). Click 'Next'.

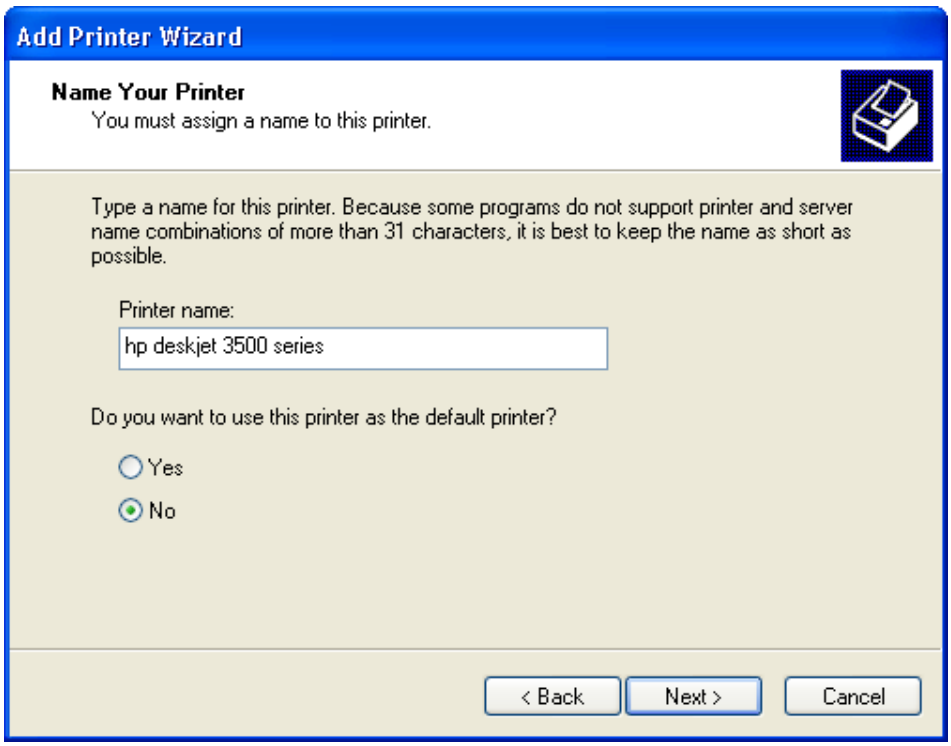

Add Printer Wizard
Name Your Printer
You must assign a name to this printer.
Type a name for this printer. Because some programs do not support printer and server name combinations of more than 31 characters, it is best to keep the name as short as possible.
Printer name:
hp deskjet 3500 series
Do you want to use this printer as the default printer?
Yes
No
< Back
Next >
Cancel

Figure 6.84. Add Printer Wizard

17. Again, press the 'Next' button to proceed to the final wizard screen.
18. Select 'Yes' to print a test page.
19. Press the 'Finish' button to complete the setup procedure.

6.5.4.2. Setting Up an LPD Printer on Mac

1. Connect the printer's USB cable to OpenRG. A printer icon appears in the 'Network Map' screen.

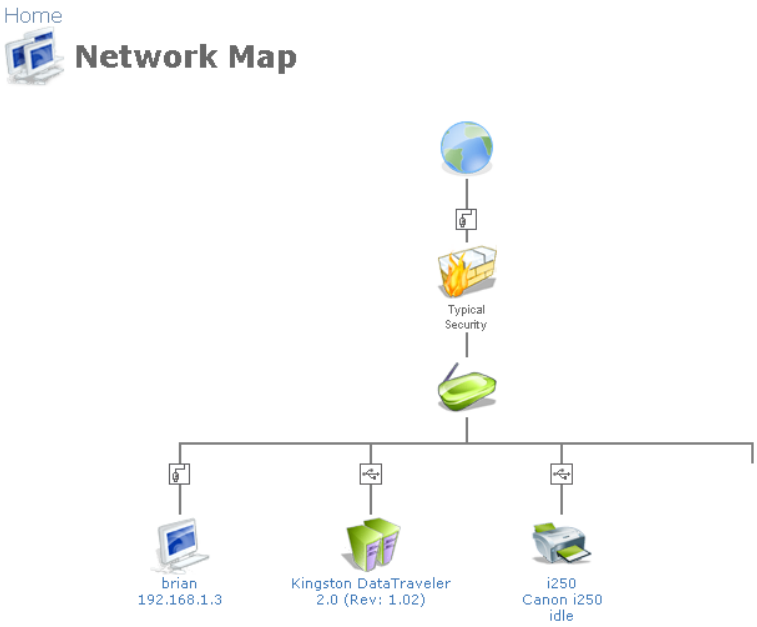


Figure 6.85. Network Map

2. On your Mac computer connected to OpenRG, open the 'Print & Fax' utility from 'System Preferences'. The 'Print & Fax' screen appears.

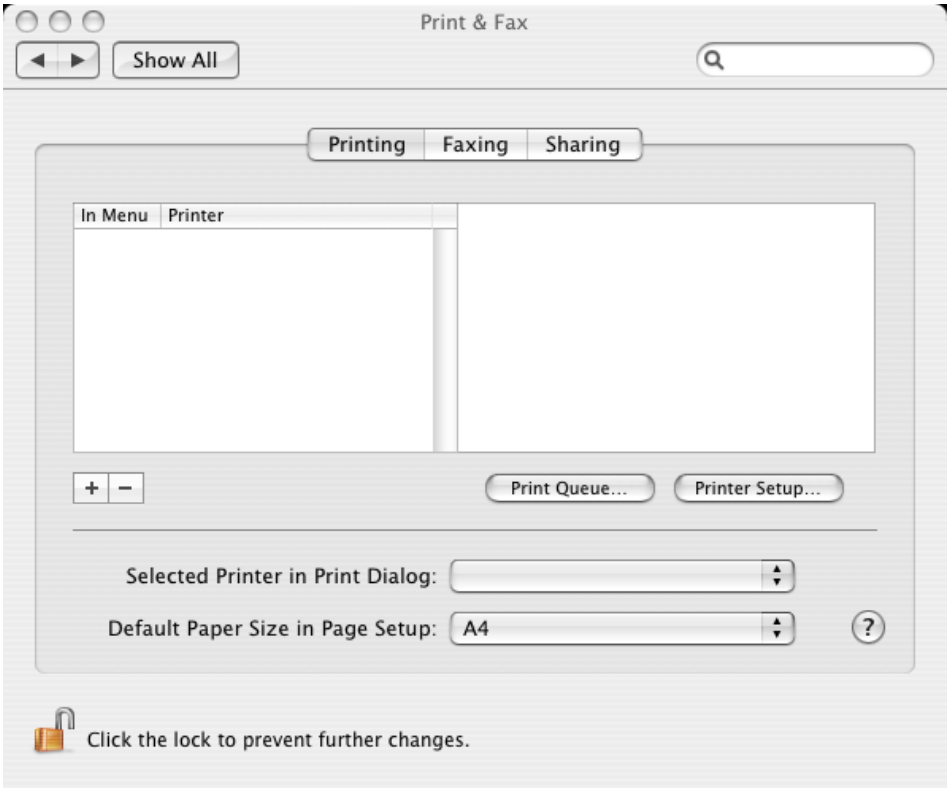


Figure 6.86. Print & Fax

1. Click the '+' (add) button. The 'Printer Browser' screen appears. Select its 'IP Printer' tab.
2. In this screen, configure the following:
    1. In the 'Protocol' drop-down list, select LPD.
    2. In the 'Address' field, enter OpenRG's IP address (192.168.1.1).
    3. In the 'Queue' field, enter the printer name as it appears in the 'Printer' screen of the WBM (see figure Figure 6.42). For example, **MFC9750** .
    4. The 'Name' and 'Location' fields are optional; the default name is the gateway's IP address.
    5. In the 'Print Using' drop-down list, select your printer's make and model.

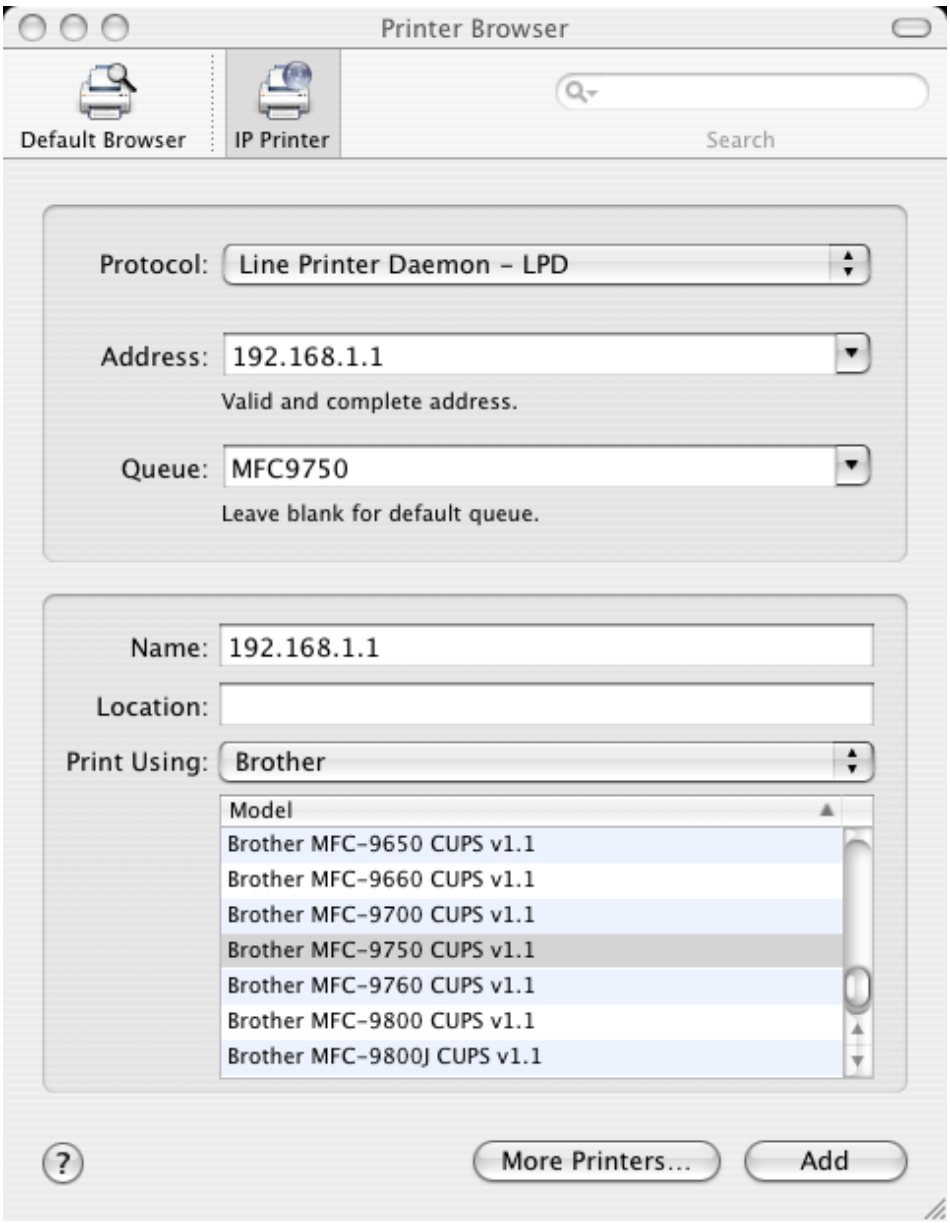


Figure 6.87. Printer Browser -- LPD Printer

3. Click the 'Add' button. The new printer appears in the 'Print & Fax' screen.

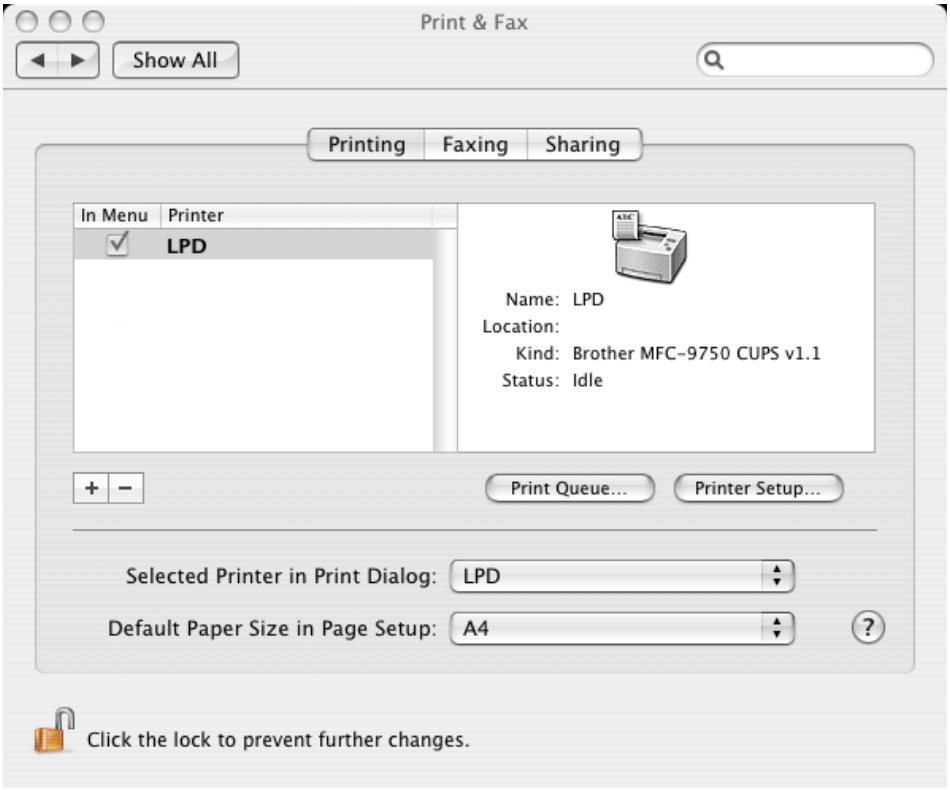


Figure 6.88. Print & Fax -- New LPD Printer

6.5.4.3. Troubleshooting

- The printer does not respond to printing requests.

  1. Ensure that the print server is enabled: click the "Print Server" icon under "Advanced" in the management console. The first option, "Enabled" should be checked.

  2. The management console screen should show diagnostic information for printer and jobs.

  3. Restart the printer.

6.6. IP-PBX

This tab presents the main screen of the Private Branch Exchange (PBX), displaying both the analog and VoIP telephone extensions available on OpenRG (see figure Figure 6.89).

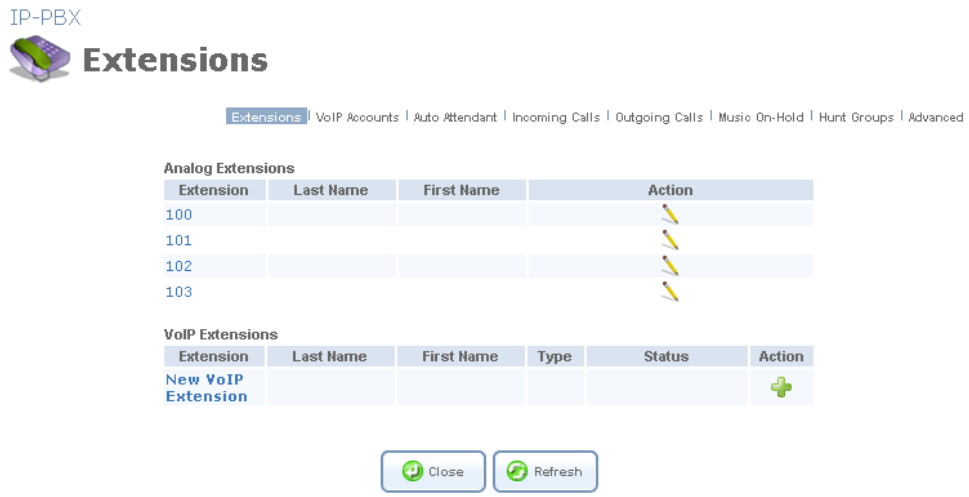


Figure 6.89. PBX Main Screen

For more information about the PBX feature, refer to section Section 7.7.

7

Services

7.1. Overview

The 'Overview' screen (see figure Figure 7.1) presents a summary of OpenRG's services and their current status (enabled/disabled). These services are configurable via their respective tabs under the 'Services' main tab.

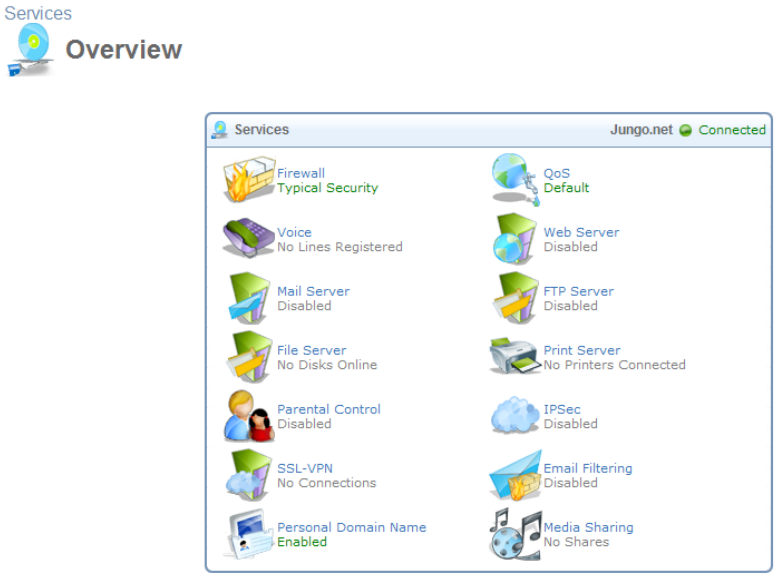


Figure 7.1. Services Overview

7.2. Jungo.net

Jungo.net is a portal that enables you to upgrade an OpenRG gateway with advanced broadband services offered by the service provider, in addition to the standard OpenRG services package. You can easily enable the Jungo.net services on your gateway, using the intuitive GUI of the Jungo.net portal. An additional benefit of using Jungo.net is that it configures the services automatically, thereby saving you time and effort. To access the portal, you need to obtain a personal Jungo.net account. You can open the Jungo.net portal from OpenRG's Web-based Management (WBM). For your convenience, the following WBM screens contain a link to Jungo.net:

- 'Quick Setup' screen of the 'Home' tab ('Jungo.net' section)
- 'Jungo.net' screen of the 'Services' tab

Alternatively, you can browse to the Jungo.net portal using the following URL: http://www.jungo.net .

There are two possible scenarios for creating a Jungo.net account:

1. The service provider creates your Jungo.net account.
2. You create a Jungo.net account either in OpenRG's 'Installation Wizard' screen or in the Jungo.net portal.

Each of the scenarios is described in the following section.

7.2.1. Creating a Jungo.net Account

The service provider can create a Jungo.net account while subscribing you to the Internet service. After the Jungo.net account is created, you receive an email that contains a personal Jungo.net username and password. After logging into OpenRG's WBM for the first time, you go through a one-time installation wizard. The installation wizard includes the 'Jungo.net Account Setup' step.

This step tests the Jungo.net account supplied by your service provider.

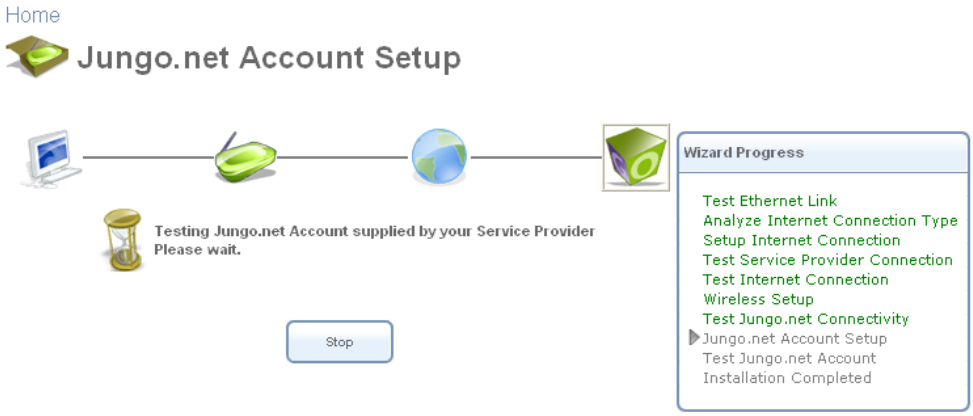


Figure 7.2. Jungo.net Account Setup

If you do not have a Jungo.net account yet, the following screen appears, enabling you to create one.

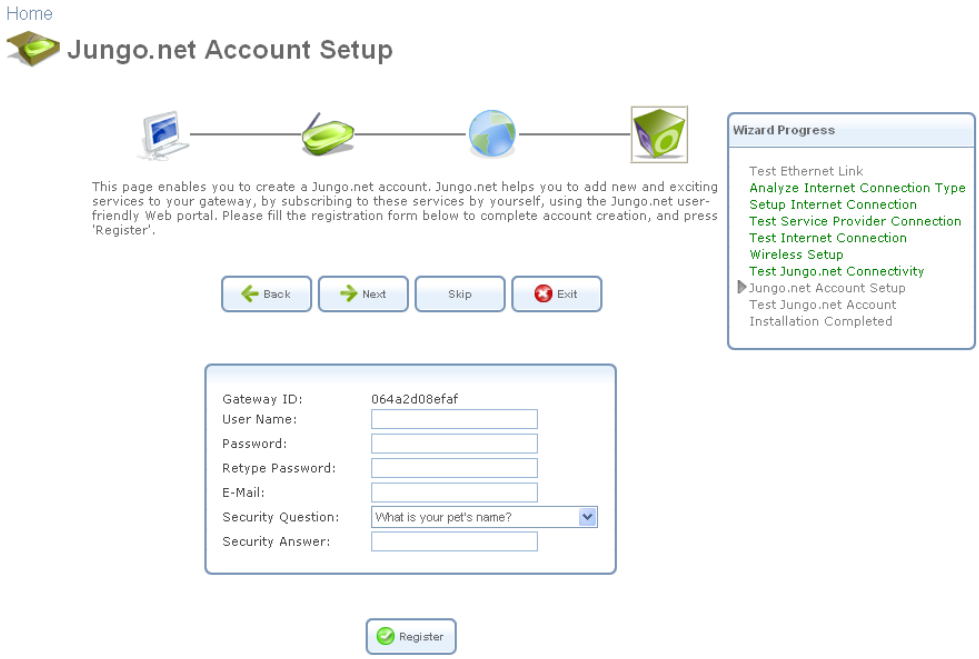


Figure 7.3. Jungo.net Account Setup -- Creating an Account

Fill in the following fields:

User Name The login name used for entering Jungo.net.

Password The password used for entering Jungo.net.

Confirm Password Retype the password for confirmation.

E-Mail Your email address.

Security Question A question asked to verify your identity.

Security Answer An answer you create for the security question.
To create the account, click 'Register'. The gateway is configured with your Jungo.net account settings.

Home
Jungo.net Account Setup
This page enables you to create a Jungo.net account. Jungo.net helps you to add new and exciting services to your gateway, by subscribing to these services by yourself, using the Jungo.net user-friendly Web portal. Please fill the registration form below to complete account creation, and press Register.
Back
Next
Skip
Exit
Configuring the gateway. Please wait...
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Wireless Setup
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed

Figure 7.4. Configuring OpenRG with the Jungo.net Account

When the gateway is configured successfully, the following screen appears.

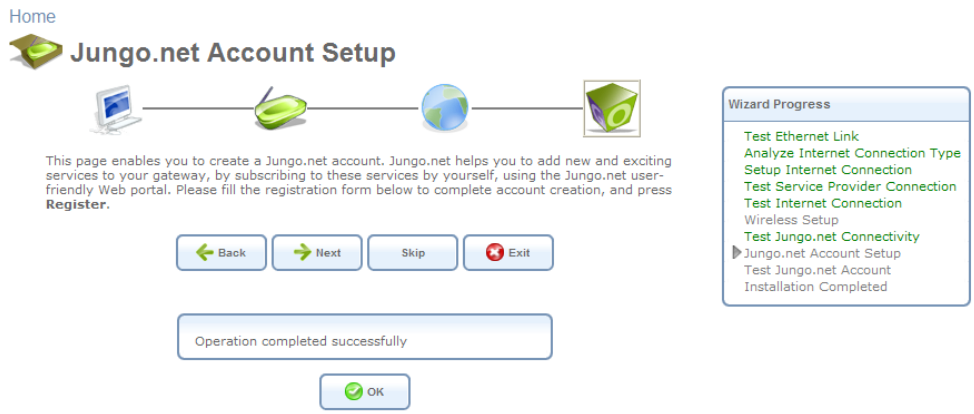

Home
Jungo.net Account Setup
This page enables you to create a Jungo.net account. Jungo.net helps you to add new and exciting services to your gateway, by subscribing to these services by yourself, using the Jungo.net user-friendly Web portal. Please fill the registration form below to complete account creation, and press Register.
Back
Next
Skip
Exit
Operation completed successfully
OK
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Wireless Setup
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed

Figure 7.5. Successful Gateway Configuration

Click 'OK'. The wizard proceeds to detect Jungo.net services supported by the gateway, and displays the following screen.

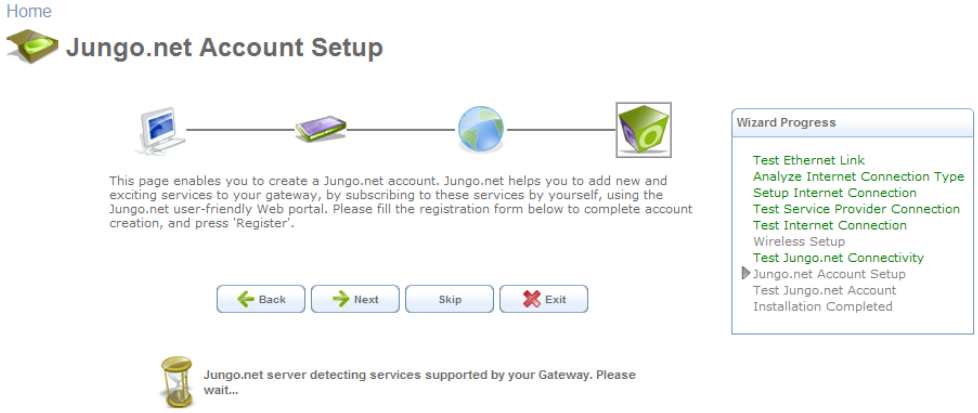

Home
Jungo.net Account Setup
This page enables you to create a Jungo.net account. Jungo.net helps you to add new and exciting services to your gateway, by subscribing to these services by yourself, using the Jungo.net user-friendly Web portal. Please fill the registration form below to complete account creation, and press 'Register'.
Back
Next
Skip
Exit
Jungo.net server detecting services supported by your Gateway. Please wait...
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Wireless Setup
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed

Figure 7.6. Detecting Jungo.net Services

Note: The detection of services may fail, if the Internet traffic is overloaded. In this case, return to the installation wizard later.

If your gateway supports the NationZone service (refer to Section 7.2.3.5), the following screen appears, offering you to enable the service on your gateway.

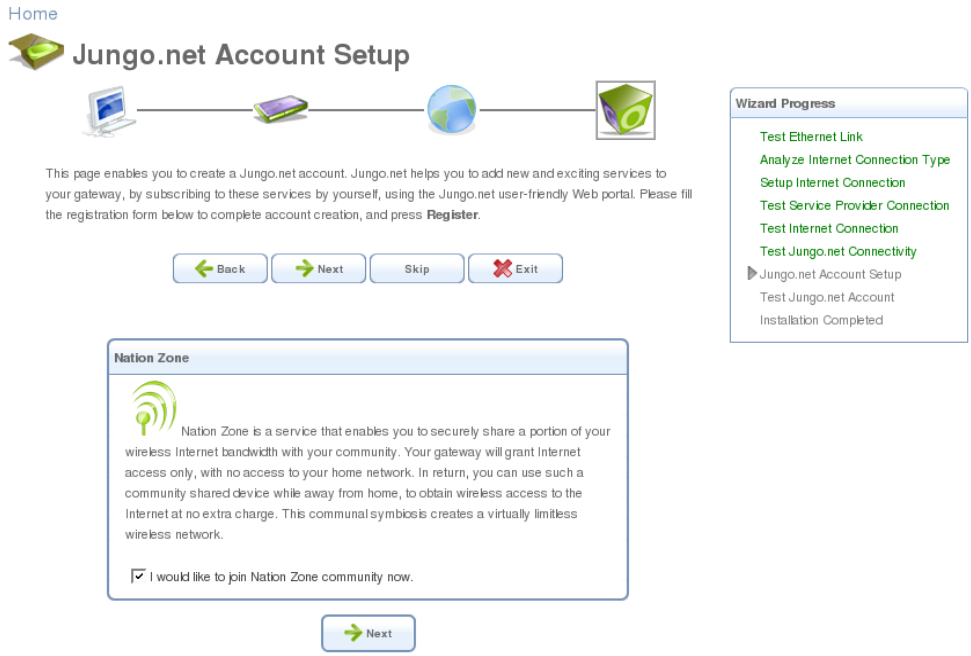

Home
Jungo.net Account Setup
This page enables you to create a Jungo.net account. Jungo.net helps you to add new and exciting services to your gateway, by subscribing to these services by yourself, using the Jungo.net user-friendly Web portal. Please fill the registration form below to complete account creation, and press Register.
Back
Next
Skip
Exit
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed
Nation Zone
Nation Zone is a service that enables you to securely share a portion of your wireless Internet bandwidth with your community. Your gateway will grant Internet access only, with no access to your home network. In return, you can use such a community shared device while away from home, to obtain wireless access to the Internet at no extra charge. This communal symbiosis creates a virtually limitless wireless network.
I would like to join Nation Zone community now.
Next

Figure 7.7. Enable NationZone

When all supported services are detected, the gateway is automatically configured with the obtained service settings. At this step, the following screen appears.

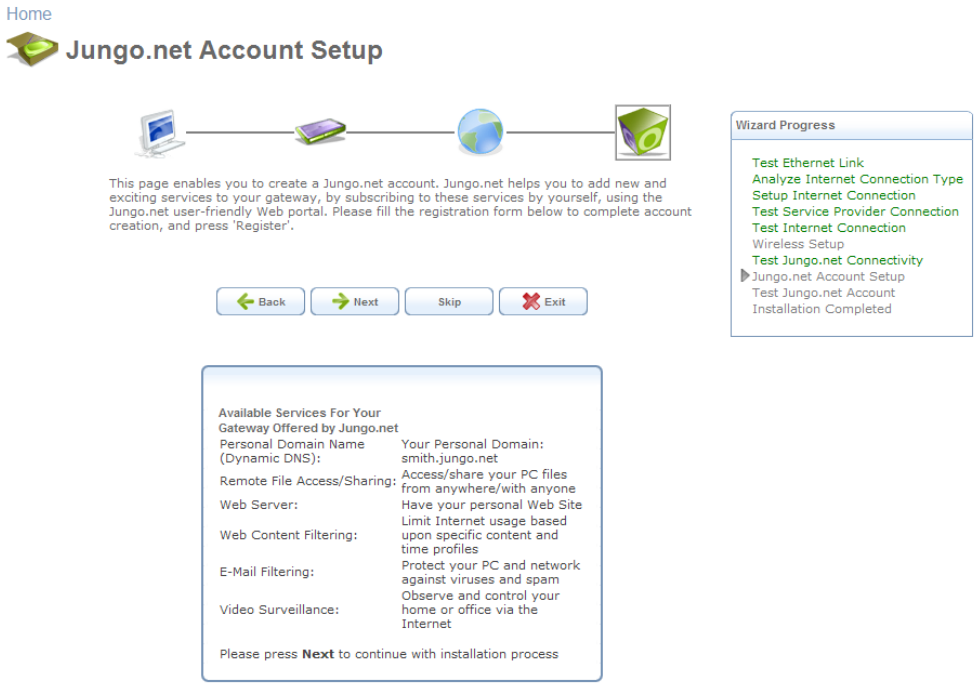

Home
Jungo.net Account Setup
This page enables you to create a Jungo.net account. Jungo.net helps you to add new and exciting services to your gateway, by subscribing to these services by yourself, using the Jungo.net user-friendly Web portal. Please fill the registration form below to complete account creation, and press 'Register'.
Back
Next
Skip
Exit
Wizard Progress
Test Ethernet Link
Analyze Internet Connection Type
Setup Internet Connection
Test Service Provider Connection
Test Internet Connection
Wireless Setup
Test Jungo.net Connectivity
Jungo.net Account Setup
Test Jungo.net Account
Installation Completed
Available Services For Your Gateway Offered by Jungo.net
Personal Domain Name (Dynamic DNS): Your Personal Domain: smith.jungo.net
Remote File Access/Sharing: Access/share your PC files from anywhere/with anyone
Web Server: Have your personal Web Site
Web Content Filtering: Limit Internet usage based upon specific content and time profiles
E-Mail Filtering: Protect your PC and network against viruses and spam
Video Surveillance: Observe and control your home or office via the Internet
Please press Next to continue with installation process

Figure 7.8. Available Jungo.net Services

Click 'Next' to proceed to the Jungo.net account validation step.
An alternative way of creating a Jungo.net account from OpenRG's WBM, is clicking the **'Don't have Jungo.net account? Register'** link located in the 'Jungo.net' screen. The link opens the 'Registration' screen of the Jungo.net portal in a new browser window. It contains the text of the Jungo.net License Agreement.

JUNGO
JUNGO.net
Language: EN English
Login | Sign Up
Home
Services
Account
Support
News
Registration
JUNGO.net LICENSE AGREEMENT
IMPORTANT - READ CAREFULLY: THIS LICENSE AGREEMENT ("AGREEMENT") IS A LEGAL AGREEMENT BETWEEN YOU AND JUNGO LTD. ("JUNGO"), FOR THE OPENRG / OPENSMB SOFTWARE PRODUCT ACCOMPANYING THIS LICENSE (THE "SOFTWARE"). JUNGO IS WILLING TO SUPPLY YOU THE ACCOMPANYING SERVICES ONLY IF YOU ACCEPT ALL OF THE TERMS IN THIS LICENSE AGREEMENT. PLEASE READ THE TERMS CAREFULLY BEFORE YOU START WORKING WITH THE SOFTWARE, BECAUSE BY STARTING TO WORK WITH THE SOFTWARE YOU ARE AGREEING TO BE BOUND BY THE TERMS OF THIS AGREEMENT. IF YOU DO NOT AGREE TO THESE TERMS, LICENSOR WILL NOT APPLY THE OFFERED SERVICES TO YOUR OPENRG/OPENSMB GATEWAY.
I Agree

Figure 7.9. Jungo.net License Agreement

To create an account, perform the following:

1. Read the license carefully and click 'I Agree' to proceed. The 'Registration' screen appears.

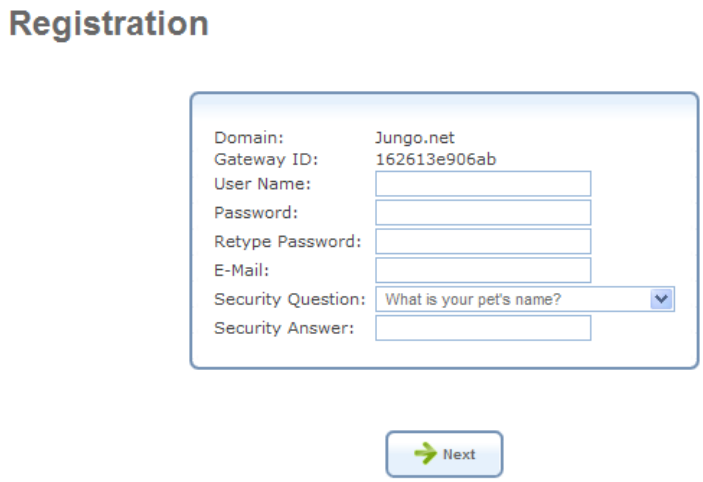


Figure 7.10. Registration Form

2. Fill in the registration form, as described earlier.
3. Click 'Next'. The 'Confirm Your Registration' screen appears, displaying your account details.

Confirm Your Registration
Please confirm your account details by pressing Next. In order to activate and apply the offered services to your Gateway, please move to Account tab after confirmation. Refer to Services tab in order to get more information about these services.
Your Account Details
User Name: jsmith
E-Mail: jsmith@jungo.net
Gateway ID: 162613e906ab
Security Question: What is your pet's name?
Security Answer: kitten
Back
Next

Figure 7.11. Confirm Your Registration

4. Click 'Next'. Jungo.net detects the services that your gateway supports.

Figure 7.12. Detecting Supported Services

Once the services supported by the gateway are detected, the following screen appears.

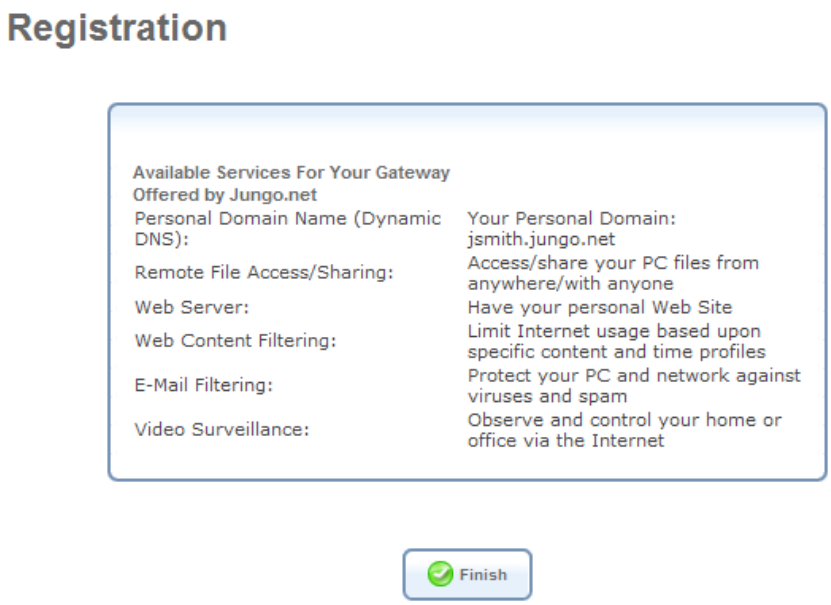

Registration
Available Services For Your Gateway
Offered by Jungo.net
Personal Domain Name (Dynamic DNS):
Your Personal Domain: jsmith.jungo.net
Remote File Access/Sharing:
Access/share your PC files from anywhere/with anyone
Web Server:
Have your personal Web Site
Web Content Filtering:
Limit Internet usage based upon specific content and time profiles
E-Mail Filtering:
Protect your PC and network against viruses and spam
Video Surveillance:
Observe and control your home or office via the Internet
Finish

Figure 7.13. Supported Jungo.net Services

5. Click 'Finish' to confirm your registration. The 'Welcome to Jungo.net' screen appears.

Welcome to Jungo.net
Welcome
Jungo.net is your personal portal for registering for powerful new services for your home or business
News
19-Nov-06 - Online Anti-Virus Service Is Available
19-Nov-06 - Video-on-Demand Service Is Released Soon
Jungo.net Services
Establish a web presence with your own personal Internet address
Access/share your PC files from anywhere/with anyone
Have your personal Web Site
Observe and control your home or office via the Internet

Figure 7.14. Welcome to Jungo.net

When you go back to the 'Jungo.net' screen of OpenRG's WBM, you will see that your Jungo.net username and password are already present in the respective fields, and the 'State' field has changed to 'Connected'. If you are not at your gateway's location or have not obtained one yet, you can open a Jungo.net account by browsing directly to the Jungo.net portal. Once you are in the portal's main page, perform the following:

1. In the upper right corner of the page, click the 'Sign Up' link. The 'Jungo.net License Agreement' screen appears (see figure Figure 7.9).

2. Read the license carefully and click 'I Agree' to proceed. The 'Registration' screen appears.

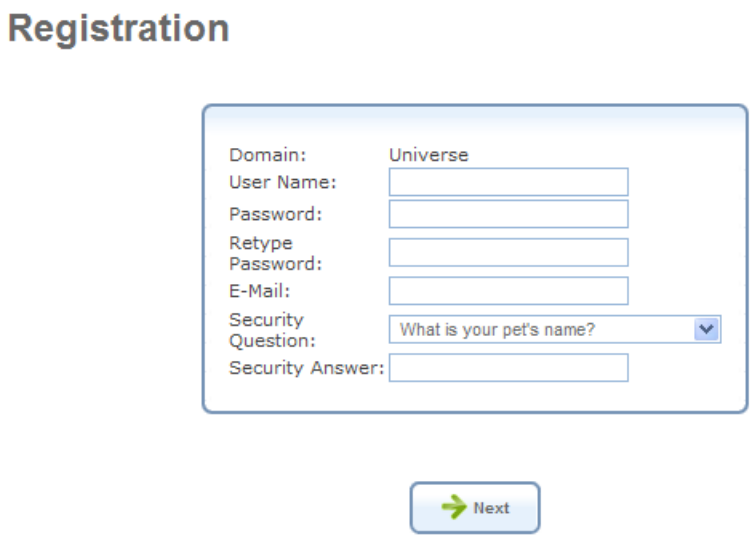


Figure 7.15. Registration Form

Note: In this case, your Jungo.net account is created in the 'Universe' domain. After it is associated with your gateway, the account will move to the domain in which the gateway is registered.

3. Fill in the registration form.
4. Click 'Next'. The 'Confirm Your Registration' screen appears.

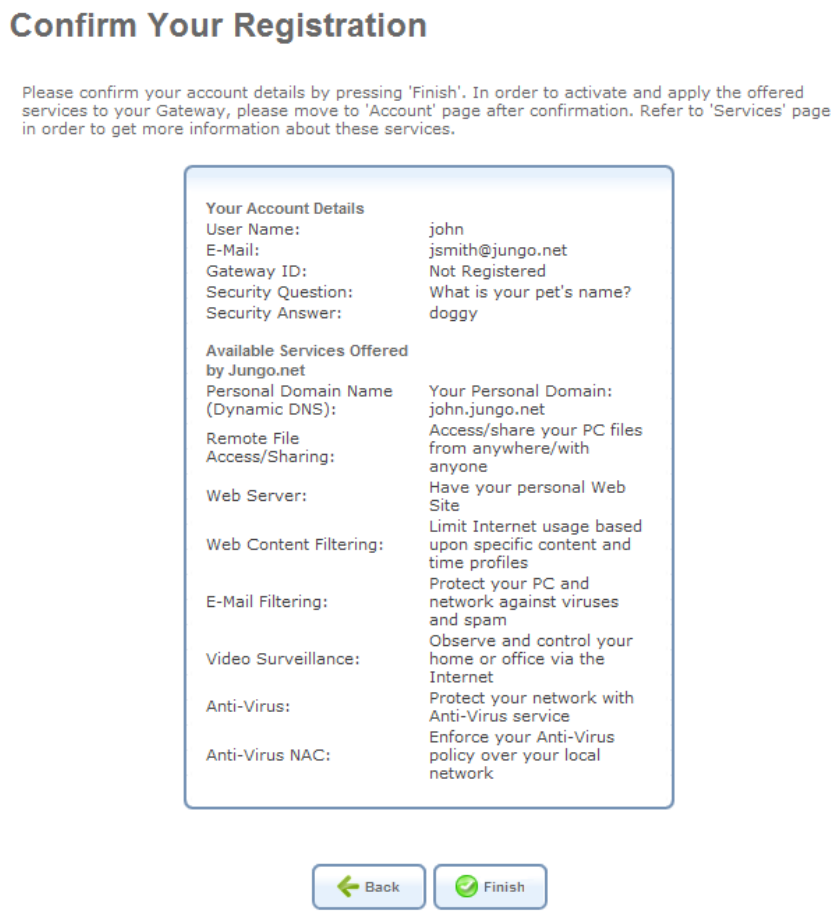

Confirm Your Registration
Please confirm your account details by pressing 'Finish'. In order to activate and apply the offered services to your Gateway, please move to 'Account' page after confirmation. Refer to 'Services' page in order to get more information about these services.
Your Account Details
User Name: john
E-Mail: jsmith@jungo.net
Gateway ID: Not Registered
Security Question: What is your pet's name?
Security Answer: doggy
Available Services Offered by Jungo.net
Personal Domain Name (Dynamic DNS): Your Personal Domain: john.jungo.net
Remote File Access/Sharing: Access/share your PC files from anywhere/with anyone
Web Server: Have your personal Web Site
Web Content Filtering: Limit Internet usage based upon specific content and time profiles
E-Mail Filtering: Protect your PC and network against viruses and spam
Video Surveillance: Observe and control your home or office via the Internet
Anti-Virus: Protect your network with Anti-Virus service
Anti-Virus NAC: Enforce your Anti-Virus policy over your local network
Back
Finish

Figure 7.16. Confirm Your Registration

The screen contains your account details and the Jungo.net services available for your gateway.

5. Click 'Finish' to confirm your registration. The 'Registration Complete' message appears.

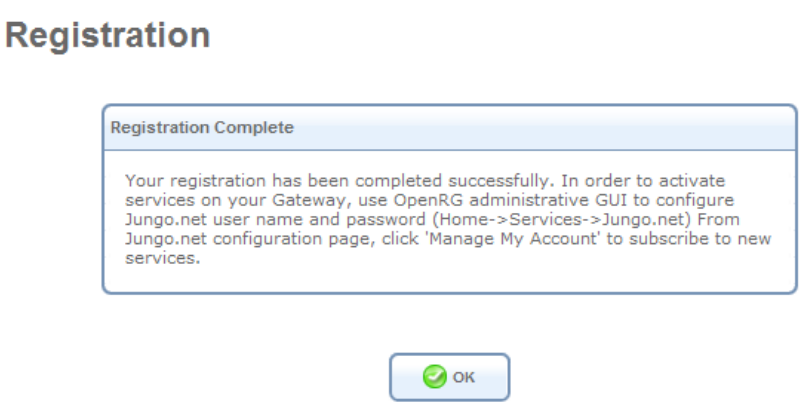

Registration
Registration Complete
Your registration has been completed successfully. In order to activate services on your Gateway, use OpenRG administrative GUI to configure Jungo.net user name and password (Home->Services->Jungo.net) From Jungo.net configuration page, click 'Manage My Account' to subscribe to new services.
OK

Figure 7.17. Registration Complete

6. Click 'OK'. The 'Welcome to Jungo.net' screen appears (see figure Figure 7.14).

After connecting the gateway, you need to associate the account with the gateway's information. You can either contact the service provider or associate the account with the gateway by yourself, as follows:

1. Under the 'Services' tab of the WBM, click the 'Jungo.net' link. The 'Jungo.net' screen appears.

Figure 7.18. Jungo.net

As no account is associated with the gateway yet, the 'State' field displays 'Not Connected' and the 'Server Response' field displays 'Registration Error' (see figure Figure 7.18).

2. Enter the account details and click 'Apply'. Your Jungo.net account state field displays 'Connecting'. This means that the account is being validated and associated with the gateway.

3. Click 'Refresh' to finalize the process. The 'State' field displays 'Connected'.

Once the 'State' field changed to 'Connected', access the Jungo.net portal to start activating the services. If you access the Jungo.net portal by clicking the 'Manage My Account' link in the WBM's 'Jungo.net' screen, you are already logged in to the portal. However, if you enter the portal's Web page by clicking the http://www.jungo.net link or from outside the WBM, you must log in first.

7.2.2. Logging into Jungo.net

You can log in to the Jungo.net portal directly from its homepage, by performing the following:

1. Browse to Jungo.net. The 'Welcome to Jungo.net' screen appears (see figure Figure 7.14).

2. Click the 'Login' link at the the top right corner. The 'Login' screen appears.

Figure 7.19. Jungo.net Login

3. Enter your username and password, and click 'OK'.

Note: You can also reach the 'Login' page by clicking the 'Account' tab.

If your forgot your password, perform the following:

1. In the 'Login' screen, click the 'Forgot your password?' link. The 'Password Reminder' screen appears.

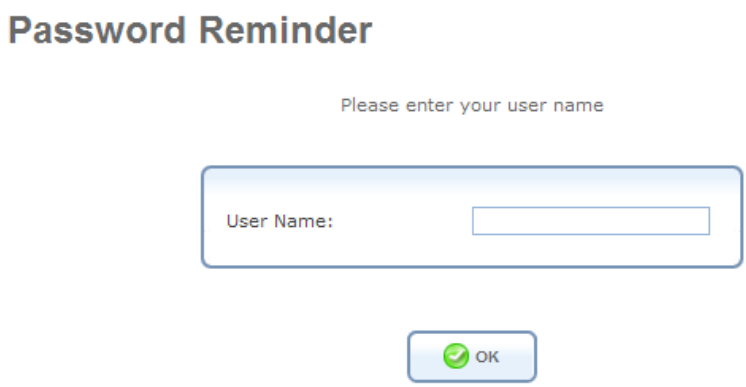


Figure 7.20. Password Reminder

2. Enter your username and click 'OK'. The following message appears.

Figure 7.21. Password Reminder Mail

3. Log in to your email account and open the message to retrieve the password.

Another case in which you need your Jungo.net login information, is when you want to reconnect your OpenRG to the Jungo.net portal. OpenRG disconnects from the Jungo.net portal after disabling the Jungo.net feature in OpenRG's WBM. The 'Jungo.net' screen changes to the following:

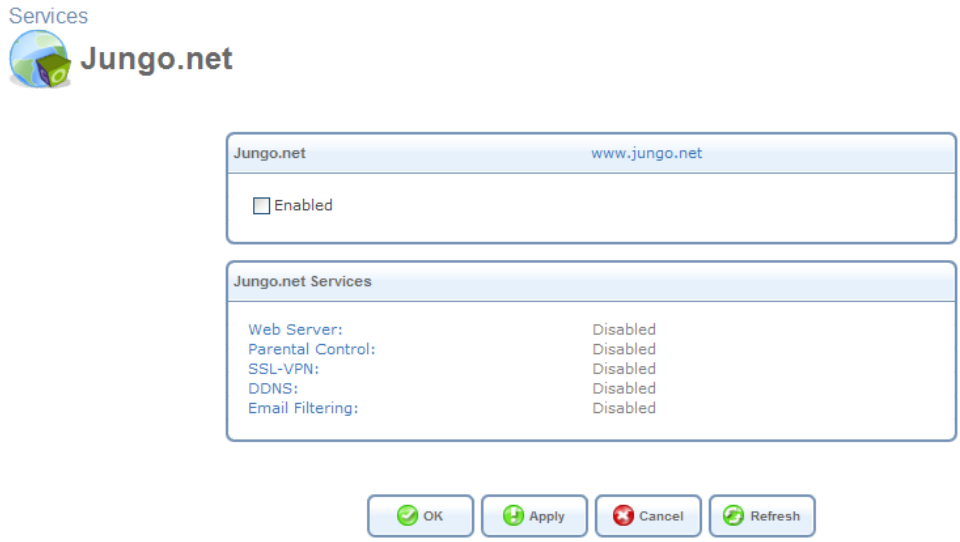


Figure 7.22. Disabled Jungo.net

To reconnect OpenRG to the Jungo.net portal, perform the following:

1. In the 'Jungo.net' screen, select the 'Enabled' check box. The login information fields become visible.
2. Fill in these fields and click 'Apply'. The 'State' field changes to "Connecting". Refresh the page until it changes to "Connected". Your gateway is now connected to the Jungo.net portal.
3. In the 'Jungo.net Services' section of the screen, click the 'Manage My Account link. The Jungo.net portal opens in a new window (see figure Figure 7.14).

In the following sections you will learn about the Jungo.net user interface.

7.2.3. Using Jungo.net Services

Clicking the 'Services' tab leads you to the 'Jungo.net Services' screen, which enables you to view the services and activate them in OpenRG.

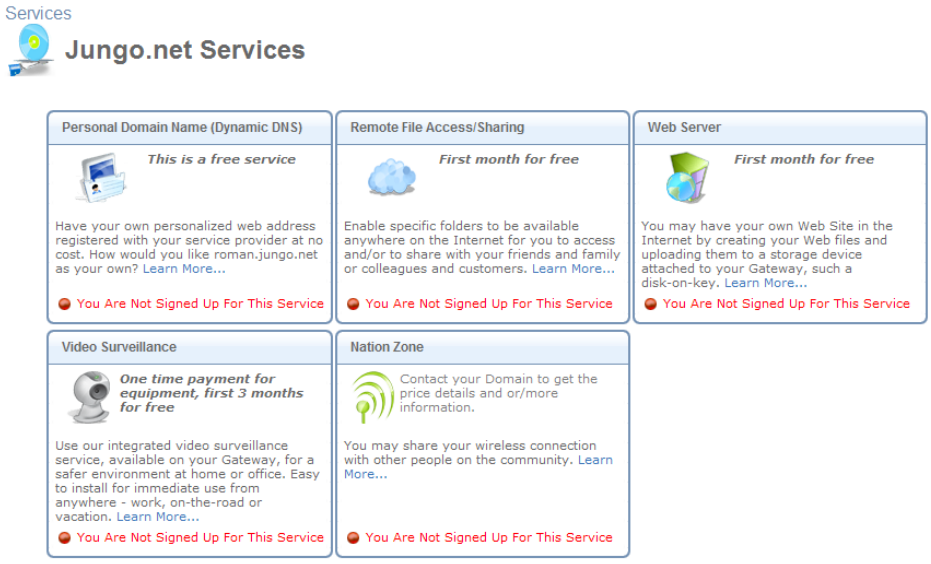

Services
Jungo.net Services
Personal Domain Name (Dynamic DNS)
This is a free service
Have your own personalized web address registered with your service provider at no cost. How would you like roman.jungo.net as your own? Learn More...
You Are Not Signed Up For This Service
Remote File Access/Sharing
First month for free
Enable specific folders to be available anywhere on the Internet for you to access and/or to share with your friends and family or colleagues and customers. Learn More...
You Are Not Signed Up For This Service
Web Server
First month for free
You may have your own Web Site in the Internet by creating your Web files and uploading them to a storage device attached to your Gateway, such a disk-on-key. Learn More...
You Are Not Signed Up For This Service
Video Surveillance
One time payment for equipment, first 3 months for free
Use our integrated video surveillance service, available on your Gateway, for a safer environment at home or office. Easy to install for immediate use from anywhere - work, on-the-road or vacation. Learn More...
You Are Not Signed Up For This Service
Nation Zone
Contact your Domain to get the price details and or/more information.
You may share your wireless connection with other people on the community. Learn More...
You Are Not Signed Up For This Service

Figure 7.23. Jungo.net Services

By default, all Jungo.net services are disabled on the gateway. When you register for a service, Jungo.net enables and configures it automatically. The 'Services' screen contains the following information:

- Services and their short description
- Your current subscription status
- Service prices

Note: If your gateway's firmware does not support a service, the following message appears instead of the subscription status field: "Service is not supported by your Gateway". To enable the service, contact the service provider to upgrade your gateway's firmware.

Available Jungo.net services are:

- Personal Domain Name (Dynamic DNS)
- Remote File Access/Sharing
- Web Server
- Video Surveillance
- NationZone

The following sections explain how to activate each of the services on the gateway via the Jungo.net portal.

7.2.3.1. Personal Domain Name

Personal Domain Name or Dynamic DNS is a service that provides you with a personal Internet address. Using this service, you can develop your own Web site, as well as enable OpenRG's remote file sharing feature. To activate the Dynamic DNS service, perform the following:

1. Click the 'Personal Domain Name' link. The service's 'Overview' screen appears.

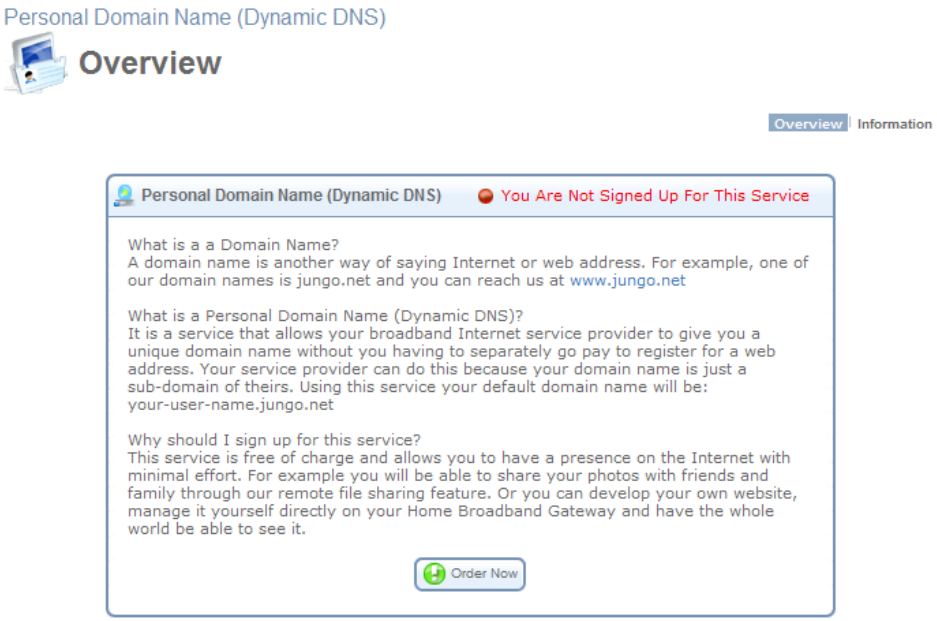

Personal Domain Name (Dynamic DNS)
Overview
Overview
Information
Personal Domain Name (Dynamic DNS)
You Are Not Signed Up For This Service
What is a a Domain Name?
A domain name is another way of saying Internet or web address. For example, one of our domain names is jungo.net and you can reach us at www.jungo.net
What is a Personal Domain Name (Dynamic DNS)?
It is a service that allows your broadband Internet service provider to give you a unique domain name without you having to separately go pay to register for a web address. Your service provider can do this because your domain name is just a sub-domain of theirs. Using this service your default domain name will be: your-user-name.jungo.net
Why should I sign up for this service?
This service is free of charge and allows you to have a presence on the Internet with minimal effort. For example you will be able to share your photos with friends and family through our remote file sharing feature. Or you can develop your own website, manage it yourself directly on your Home Broadband Gateway and have the whole world be able to see it.
Order Now

Figure 7.24. Dynamic DNS Service Overview

Note: Clicking the 'Information' link at the middle right side of the screen leads you to the 'Information' screen, where additional service information, such as its price, is displayed.

2. Read the service-related information and click 'Order Now'. The 'Order New Service' screen appears.

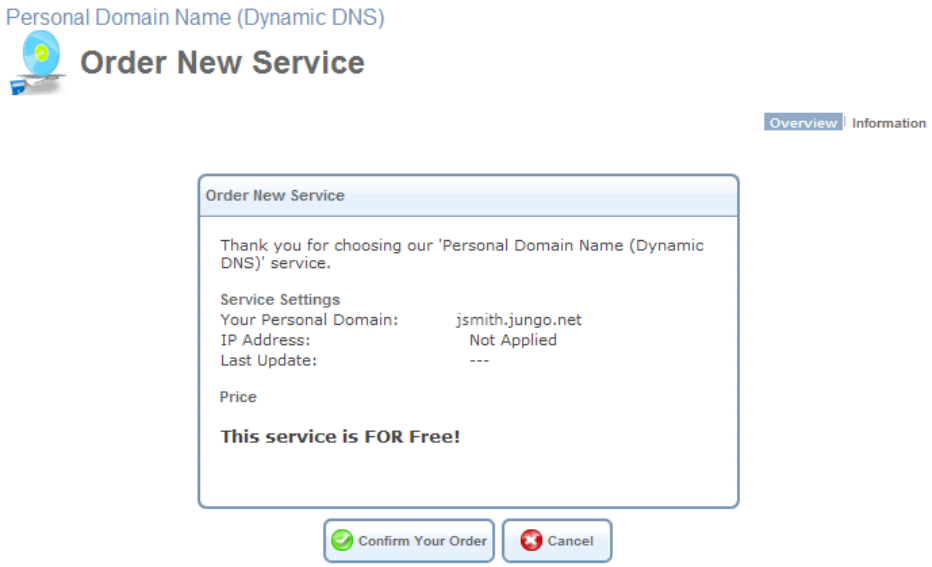


Figure 7.25. Order Dynamic DNS Service

3. Click 'Confirm Your Order'. After configuring your gateway, the following screen appears.

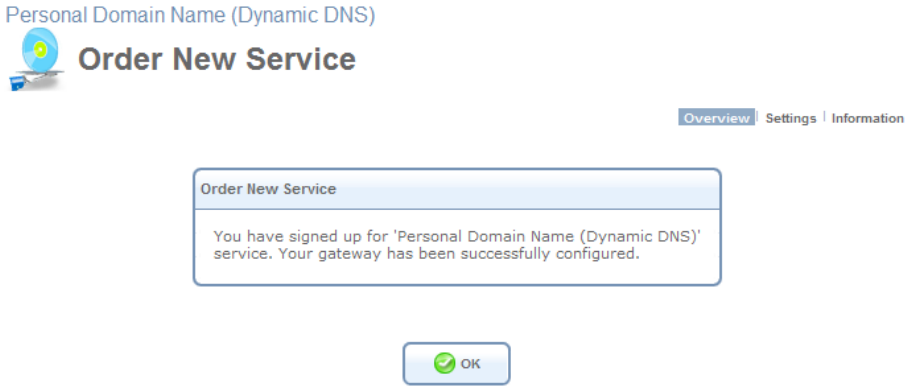

Personal Domain Name (Dynamic DNS)
Order New Service
Overview | Settings | Information
Order New Service
You have signed up for 'Personal Domain Name (Dynamic DNS)' service. Your gateway has been successfully configured.
OK

Figure 7.26. Successful Dynamic DNS Activation

4. Click 'OK'. 'Your Jungo.net Account' screen appears.

Figure 7.27. Your Jungo.net Account

The status of the service is now 'Active'. In the example shown in figure Figure 7.27 , the user's auto-generated domain name is `jsmith.jungo.net` , according to the user name.

Note: Use the 'Reconfigure My Settings' button if you changed OpenRG's service settings configured by Jungo.net. By clicking the 'Reconfigure My Settings' button you restore the service's last settings.

5. To view the effect on your gateway settings, click the 'Dynamic DNS' link in OpenRG's 'Jungo.net' screen. The 'Dynamic DNS' screen appears, configured with `yourname.jungo.net` as a Dynamic DNS entry.

Figure 7.28. Active Dynamic DNS

In addition, to verify that the name is resolved, browse to `yourname.jungo.net` . If the name is resolved, the WBM's login page opens.

7.2.3.2. Remote File Access and Sharing

The Remote File Access/Sharing service enables you to access your PC's shared folders from anywhere and at any time. In addition, you can set up a 'Guest' profile to allow the people you trust to use your shared files.

Note: This service is also known as Secure Socket Layer VPN (SSL-VPN)---the name used in OpenRG's WBM.

To activate the service, perform the following:

1. Click the 'Remote File Access/Sharing' link. The service's 'Overview' screen appears.

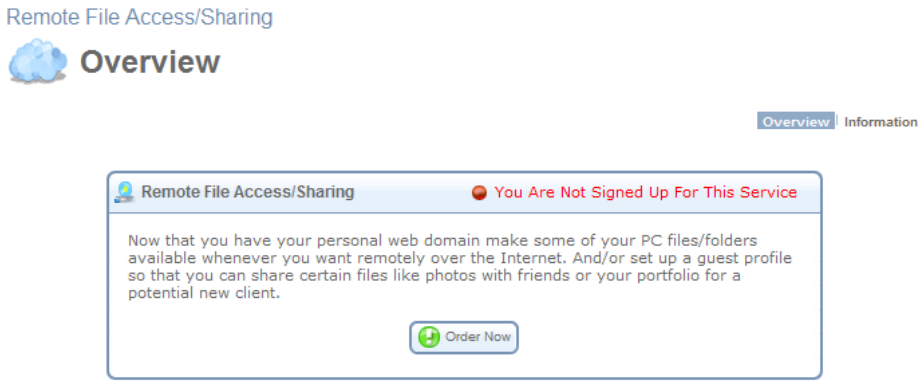

Remote File Access/Sharing
Overview
Overview | Information
Remote File Access/Sharing
You Are Not Signed Up For This Service
Now that you have your personal web domain make some of your PC files/folders available whenever you want remotely over the Internet. And/or set up a guest profile so that you can share certain files like photos with friends or your portfolio for a potential new client.
Order Now

Figure 7.29. Remote File Access/Sharing Service Overview

2. Read the service-related information and click 'Order Now'. The 'Order New Service' screen appears.

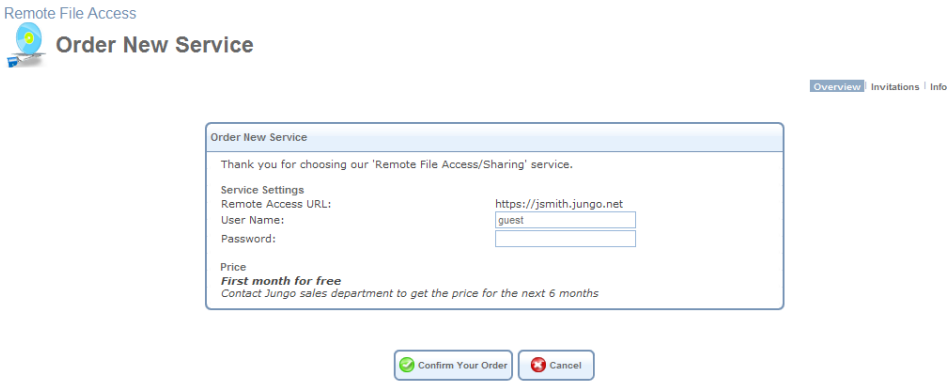


Figure 7.30. Order Remote File Access/Sharing Service

In the example shown in figure Figure 7.30 , the user's remote access URL is `https://jsmith.jungo.net` .

Note: If you don't activate the Dynamic DNS service, you can still access your file shares remotely by entering your IP address after the `https://` part of the remote access URL.

3. If you wish, change the default username ("guest"), and enter a password. A remote user will need this information to access the SSL-VPN portal.

4. Click 'Confirm Your Order'. After configuring your gateway, the following screen appears.

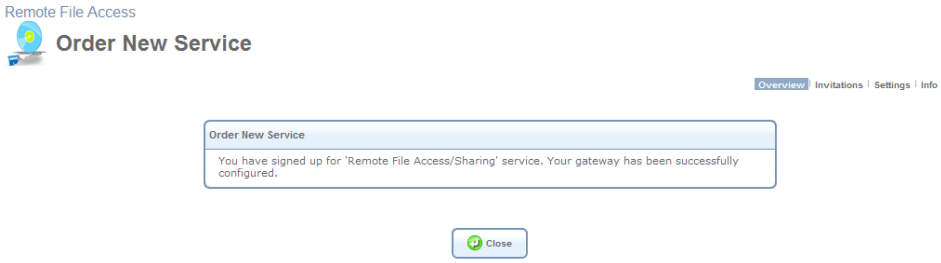

Remote File Access
Order New Service
Overview | Invitations | Settings | Info
Order New Service
You have signed up for 'Remote File Access/Sharing' service. Your gateway has been successfully configured.
Close

Figure 7.31. Successful Remote File Access/Sharing Activation

5. Click 'Close'. The service's 'Overview' screen appears.

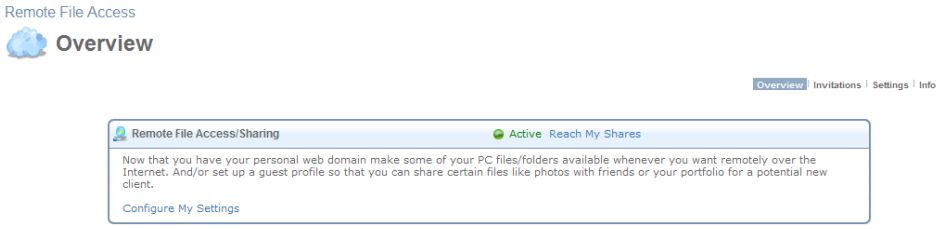

Remote File Access
Overview
Overview | Invitations | Settings | Info
Remote File Access/Sharing
Active Reach My Shares
Now that you have your personal web domain make some of your PC files/folders available whenever you want remotely over the Internet. And/or set up a guest profile so that you can share certain files like photos with friends or your portfolio for a potential new client.
Configure My Settings

Figure 7.32. Remote File Access Overview

To test the service, perform the following:

1. Click the 'Reach My Shares' link. The 'Login' page of OpenRG's SSL-VPN portal appears.

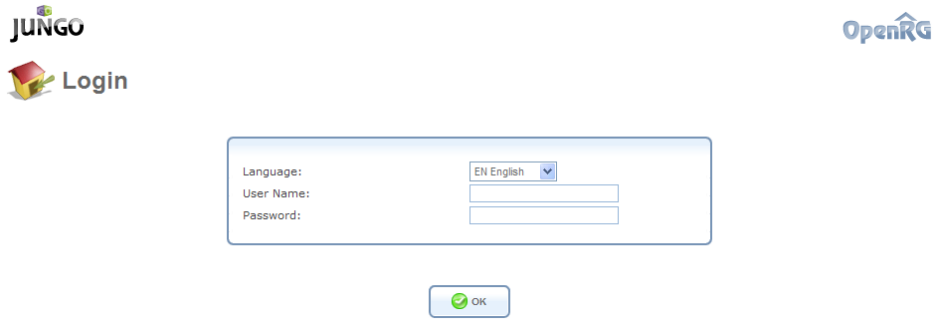


Figure 7.33. SSL-VPN Portal's Login Page

2. Log in with the created account to view your shares. The 'My Network' screen appears.

Figure 7.34. My Network

Note: If you log in with your OpenRG administrator account, OpenRG's WBM page opens instead of the SSL-VPN portal.

3. Click the relevant PC link to access the shared directories.

To view the effect on your gateway settings, click the 'SSL-VPN' link in OpenRG's 'Jungo.net' screen. The 'SSL-VPN' screen appears.

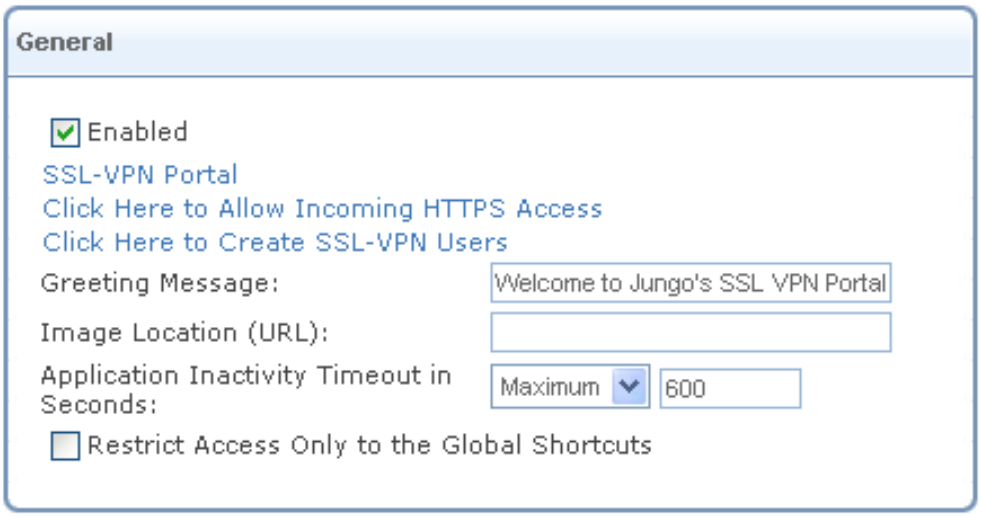


Figure 7.35. Enabled SSL-VPN

Once the service is activated, the 'Enabled' check box is selected and the 'SSL-VPN Portal' link appears. For more information, refer to section Section 7.10.2. If you wish to inform a remote user about the shared files and how to access them, use the 'Invite a Friend to Share This Folder' link, located in OpenRG's 'File Server' screen. This link appears after connecting the gateway to the Jungo.net portal (for more information, refer to section Section 7.11.2.3).

Note: A file sharing invitation message contains a direct link to a share. When clicked, it automatically authenticates the remote user and opens the share's page. Therefore, there is no need to add the login information to the invitation message.

After sending file sharing invitations to remote users, you can view a list of sent messages by clicking the 'Invitations' link in the 'Remote File Access Overview' screen. The following screen appears.

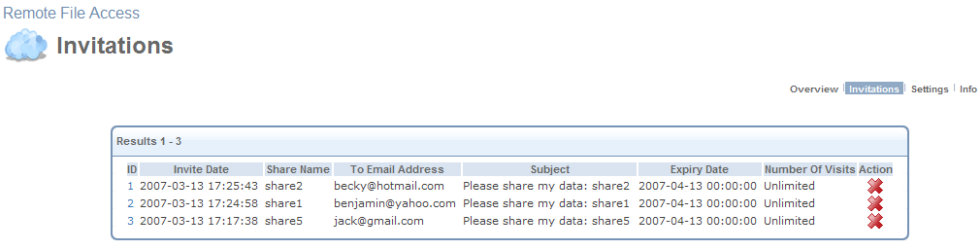


Figure 7.36. Remote File AccessInvitations

At any time, you can cancel an invitation by clicking its action icon . The Jungo.net portal configures OpenRG's file server accordingly. From this moment, the invited remote user will not be able to access your SSL-VPN portal and use the shares. If you wish to change the SSL-VPN portal's login settings, perform the following:

1. Click the 'Settings' link. The following screen appears.

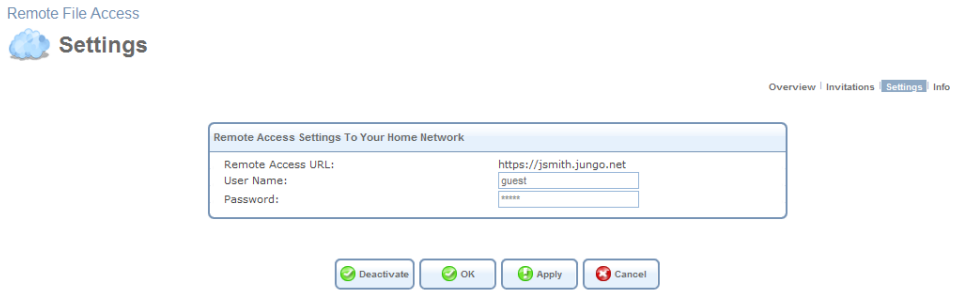


Figure 7.37. Remote File Access Settings

2. Update the login information, and click 'OK'.

7.2.3.3. Web Server

The Web Server service enables you to create your own Web site that is hosted on your gateway. Other Internet users will be able to access your Web site without entering your home or office network. This feature requires that you connect a storage device with Web site content to OpenRG. Your Web site content must be placed in the **website** directory located at the root of the file system. When the storage device with the Web content is connected to OpenRG, the 'Enabled' message is displayed in WBM's 'Web Server' screen. However, if the storage device is not connected, or improperly formatted, this screen appears as follows.

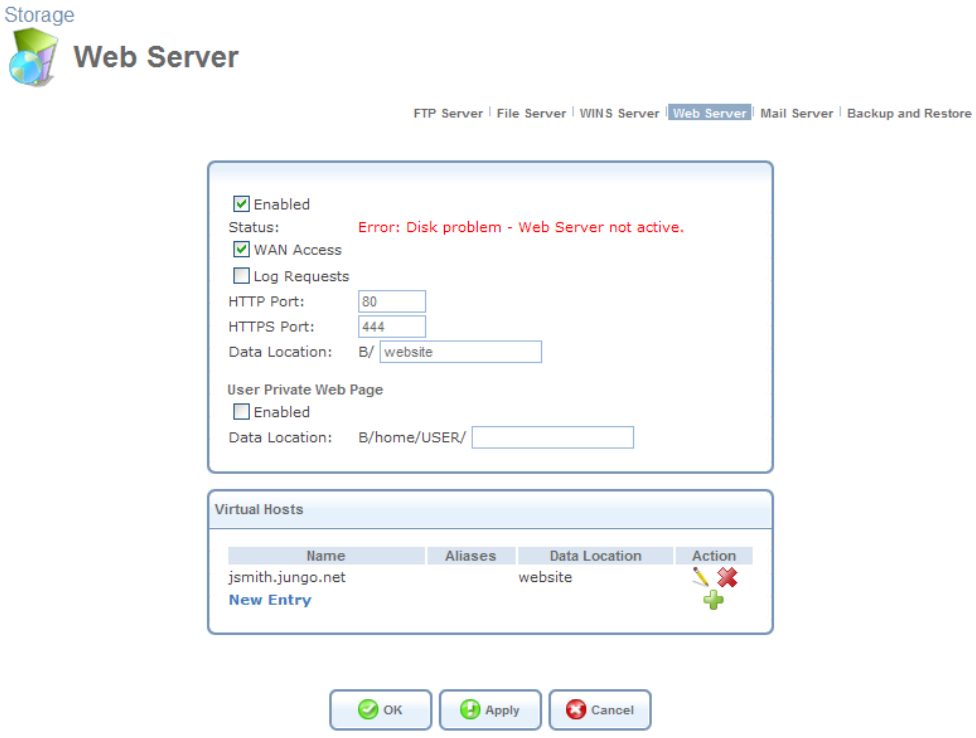


Figure 7.38. Web Server's Disk Problem

It is important that the storage device is formatted in either Linux EXT2 or EXT3 file systems. For more information, refer to Section 6.4.1.3. To activate the service, perform the following:

1. Click the 'Web Server' link. The service's 'Overview' screen appears.

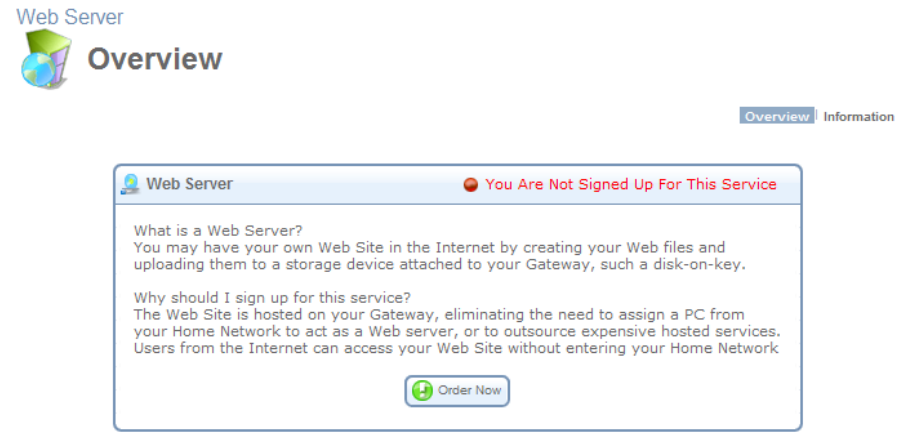

Web Server
Overview
Overview | Information
Web Server
You Are Not Signed Up For This Service
What is a Web Server?
You may have your own Web Site in the Internet by creating your Web files and uploading them to a storage device attached to your Gateway, such a disk-on-key.
Why should I sign up for this service?
The Web Site is hosted on your Gateway, eliminating the need to assign a PC from your Home Network to act as a Web server, or to outsource expensive hosted services. Users from the Internet can access your Web Site without entering your Home Network
Order Now

Figure 7.39. Web Server Overview

2. Read the service-related information and click 'Order Now'. The 'Order New Service' screen appears.

Figure 7.40. Order Web Server Service

In the example shown in figure Figure 7.40 , the user's Web site URL is `http://jsmith.jungo.net` .

3. Click 'Confirm Your Order'. After configuring your gateway, the following screen appears.

Web Server
Order New Service
Overview | Settings | Information
Order New Service
You have signed up for 'Web Server' service. Your gateway has been successfully configured.
OK

Figure 7.41. Successful Web Server Activation

4. Click 'OK'. 'Your Jungo.net Account' screen appears.

Figure 7.42. Your Jungo.net Account

To test the service, click the 'Visit My Web Site' link. If a storage device with the Web site content is connected to OpenRG, your Web site's homepage opens in a new browser window. Alternatively, open a new browser window and enter `http://yourname.jungo.net` .

Note: After the service is activated, HTTP port 80 is utilized by the Web Server. If OpenRG's WBM uses the same port, it will disconnect. To access it again, enter the following IP address: 192.168.1.1:8080 or 192.168.1.1:8082 . The `:8080` or `:8082` suffix means that the WBM uses an alternative HTTP port (8080 or 8082), as the default port (80) is used by the Web Server.

To view the effect on your gateway settings, click the 'Web Server' link in OpenRG's 'Jungo.net' screen. The 'Web Server' screen appears.

Figure 7.43. Activated Web Server

For more information, refer to section Section 7.11.4.

7.2.3.4. Video Surveillance

The Video Surveillance service enables you to monitor your home or office via IP cameras. If you don't have the required surveillance equipment, you can purchase it via the Jungo.net portal, while registering for the service. To activate the service, perform the following:

1. Click the 'Video Surveillance' link. The 'Overview' screen appears.

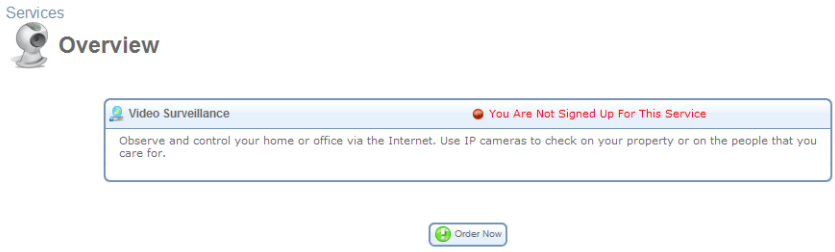

Services
Overview
Video Surveillance
You Are Not Signed Up For This Service
Observe and control your home or office via the Internet. Use IP cameras to check on your property or on the people that you care for.
Order Now

Figure 7.44. Service Overview

2. Click 'Order Now'. The 'Order New Service' screen appears.

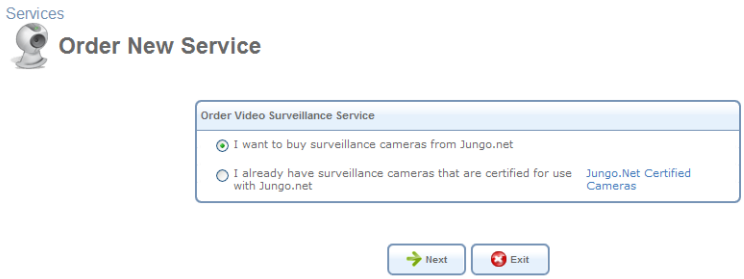

Services
Order New Service
Order Video Surveillance Service
I want to buy surveillance cameras from Jungo.net
I already have surveillance cameras that are certified for use with Jungo.net
Jungo.Net Certified Cameras
Next
Exit

Figure 7.45. Order New Service

3. You can view the required Jungo.net-certified equipment by clicking the 'Jungo.net Certified Cameras' link. The following screen appears.

Figure 7.46. Jungo.net-certified IP Cameras

4. Click 'Close' to return to the previous screen.

5. Select whether you want to purchase one or more cameras by clicking the corresponding radio button, and click 'Next'. If you chose to purchase the cameras, the following screen appears.

Figure 7.47. IP Cameras Order Form

1. Specify the quantity for the cameras you wish to purchase.

2. Click 'Next'. The following screen appears.

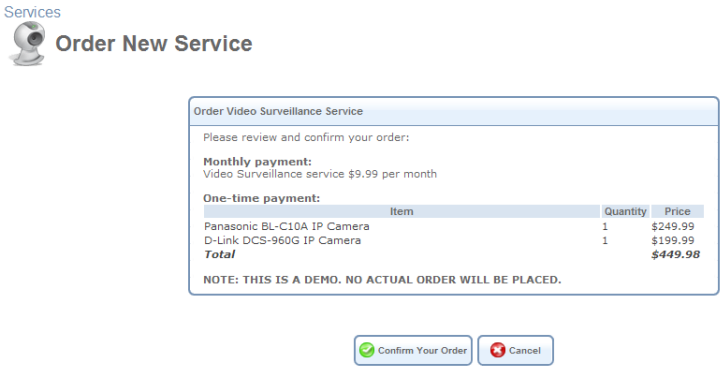


Figure 7.48. IP Cameras Order Summary

3. Click 'Confirm Your Order' to submit the equipment order and to activate the service. The order confirmation screen appears.

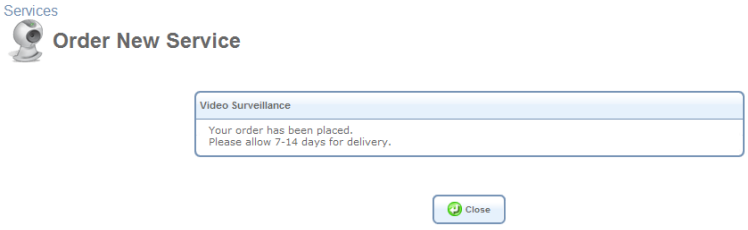


Figure 7.49. IP Cameras Order Confirmation

If you chose not to purchase the cameras (see figure Figure 7.45), perform the following:

1. Click 'Next'. The following screen appears.

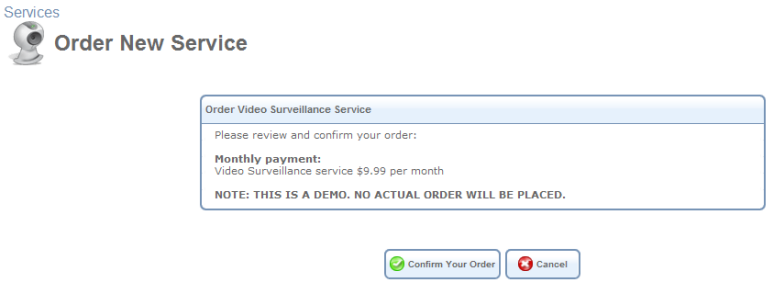

Services
Order New Service
Order Video Surveillance Service
Please review and confirm your order:
Monthly payment:
Video Surveillance service $9.99 per month
NOTE: THIS IS A DEMO. NO ACTUAL ORDER WILL BE PLACED.
Confirm Your Order
Cancel

Figure 7.50. Service Order Summary – Without Cameras

2. Click 'Confirm Your Order' to activate the service. The order confirmation screen appears.

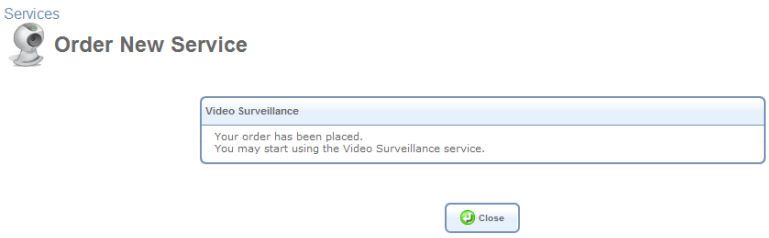


Figure 7.51. Surveillance Order Confirmation

6. In either of the cases, click 'Close'. The 'Video Surveillance Overview' screen appears.

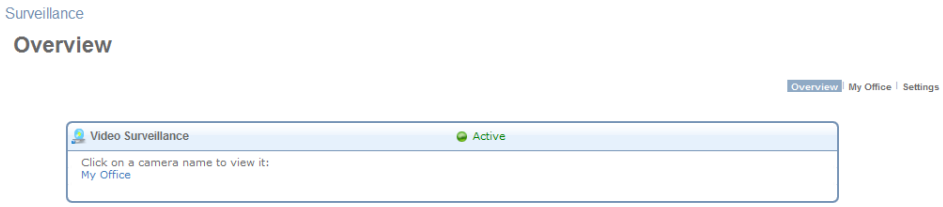


Figure 7.52. Video Surveillance Overview

Once a camera is installed, test the service by clicking the camera link displayed in the 'Video Surveillance Overview' screen. You will see the area on which the camera is focused.

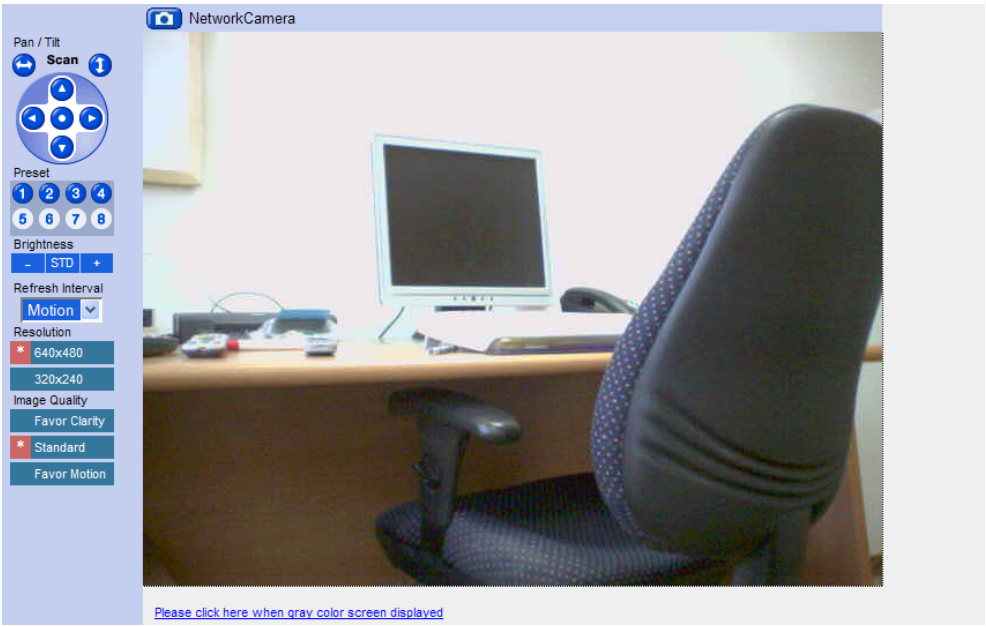


Figure 7.53. Surveilled Area

You can view the settings of your cameras by clicking the 'Settings' tab. The 'Settings' screen appears.

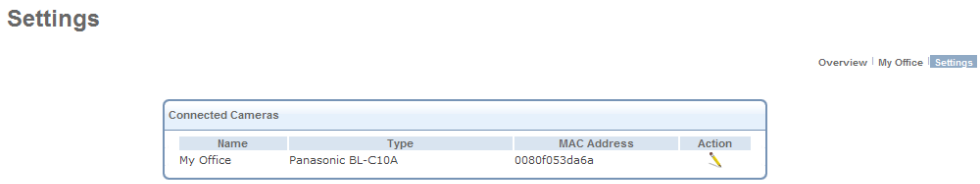


Figure 7.54. Video Surveillance Settings

You can rename a camera by clicking its action icon . The following screen appears.

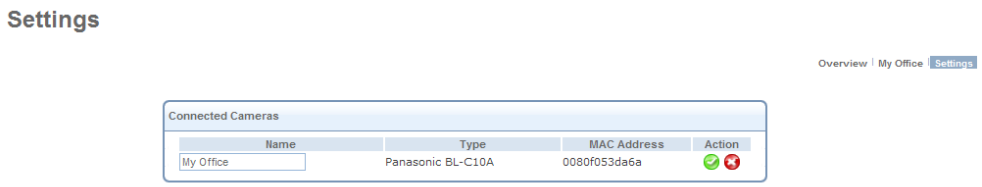


Figure 7.55. Rename Camera

Enter a new name for the camera and click the action icon . Otherwise, click the action icon to return to the 'Settings' screen.

7.2.3.5. NationZone

NationZone is a service that enables you to share your wireless Internet connection in a secure and effective way. Only authorized wireless clients will be able to use your Internet connection. Moreover, the wireless clients will not be able to view or access your local network. When this service is activated, the Jungo.net portal automatically configures OpenRG's firewall to secure your LAN, and adds a virtual access point to OpenRG's network devices. This virtual access point is assigned a unique wireless network name, or a Service Set Identifier (SSID), called "NationZone". In addition, Jungo.net configures OpenRG's QoS so that only one fourth of your bandwidth will be granted to authorized wireless clients. To activate the service, perform the following:

1. Under the 'Services' tab, click the 'NationZone' link. The 'Overview' screen appears.

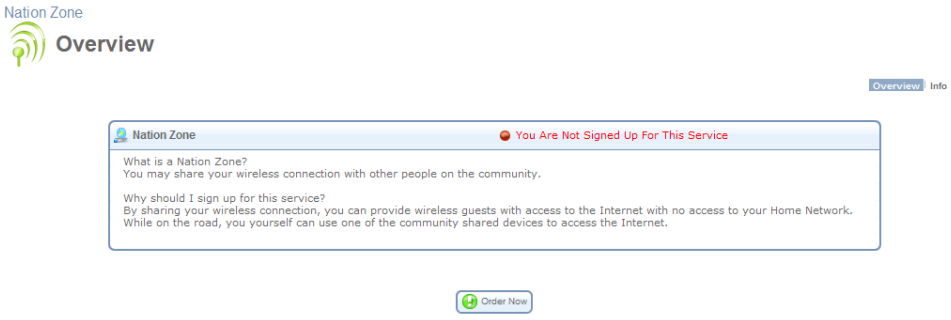

Nation Zone
Overview
Overview
Info
Nation Zone
You Are Not Signed Up For This Service
What is a Nation Zone?
You may share your wireless connection with other people on the community.
Why should I sign up for this service?
By sharing your wireless connection, you can provide wireless guests with access to the Internet with no access to your Home Network.
While on the road, you yourself can use one of the community shared devices to access the Internet.
Order Now

Figure 7.56. NationZone Overview

2. Read the service description. For additional information, click the 'Information' link.
3. Click 'Order Now'. The 'Order New Service' screen appears.

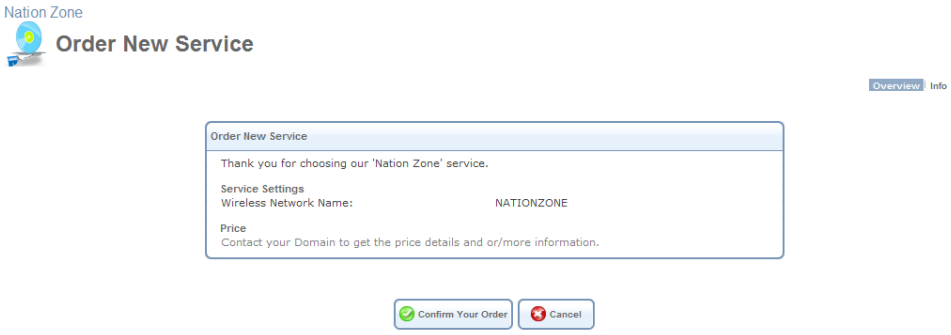


Figure 7.57. Order New Service

4. Click 'Confirm your Order'. After configuring your gateway, the order confirmation screen appears.

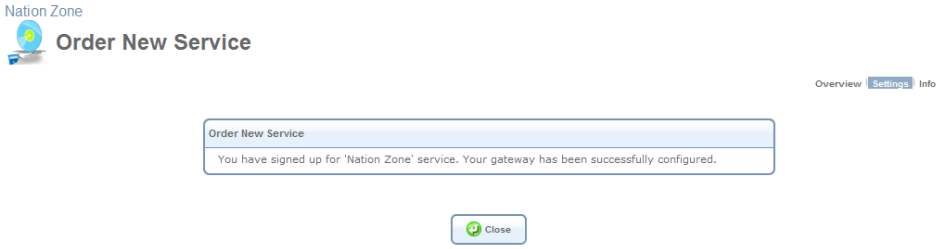

Nation Zone
Order New Service
Overview Settings Info
Order New Service
You have signed up for 'Nation Zone' service. Your gateway has been successfully configured.
Close

Figure 7.58. Service Order Confirmation

5. Click 'Close'. The 'Overview' screen appears, with the service state changed to 'Active'.

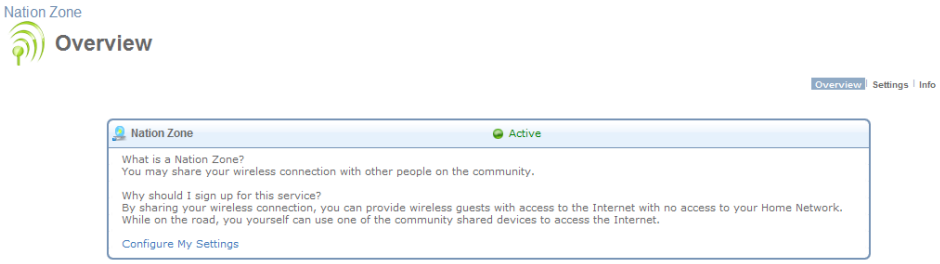

Nation Zone
Overview
Overview Settings Info
Nation Zone
Active
What is a Nation Zone?
You may share your wireless connection with other people on the community.
Why should I sign up for this service?
By sharing your wireless connection, you can provide wireless guests with access to the Internet with no access to your Home Network.
While on the road, you yourself can use one of the community shared devices to access the Internet.
Configure My Settings

Figure 7.59. Activated NationZone

To access the service's settings, click the 'Settings' link. The 'Settings' screen appears.

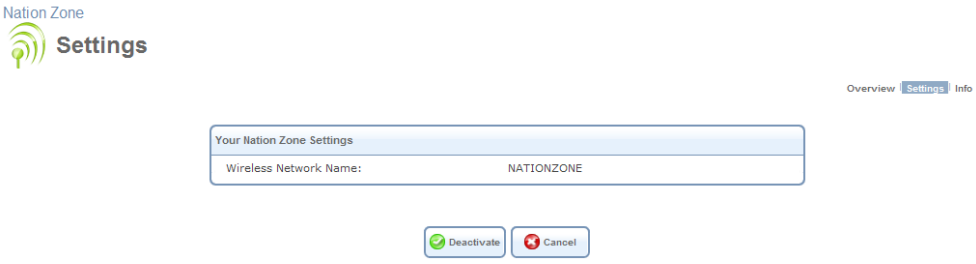


Figure 7.60. NationZone Settings

The 'Settings' screen enables you to deactivate the service or activate it again. When the 'Deactivate' button is clicked, the 'Your Jungo.net Account' screen appears.

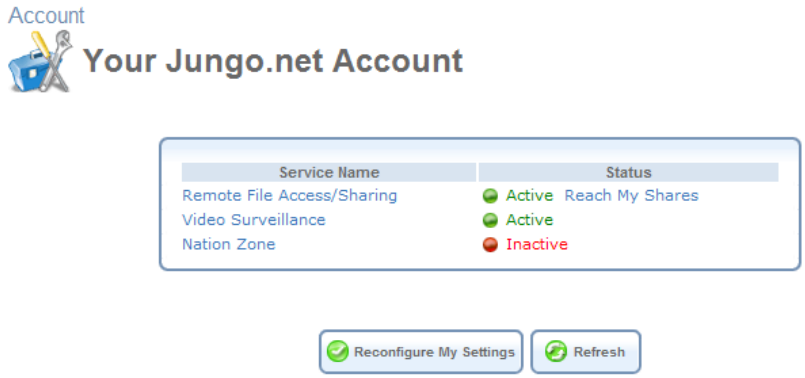


Figure 7.61. Your Jungo.net Account

To reactivate the service, perform the following:

1. Click the 'NationZone' link.

2. In the 'Settings' screen that appears, click 'Activate'. The service is active again.

In case of restoring OpenRG's default settings or changing some of your wireless connection settings, the 'NationZone' service will stop functioning. To reconfigure OpenRG with the service's settings, perform the following:

1. In the service's 'Overview' screen (see figure Figure 7.59), click the 'Configure My Settings' link. The 'Your Jungo.net Account' screen appears (see figure Figure 7.61).

2. Click the 'Reconfigure My Settings' button. The Jungo.net portal reconfigures OpenRG with the service settings.

To view the effect on your gateway settings, click the WBM's 'Local Network' tab, and then 'Devices'. The 'Device' screen appears, displaying all network devices located under OpenRG's LAN bridge, and the virtual access point that is connected separately.

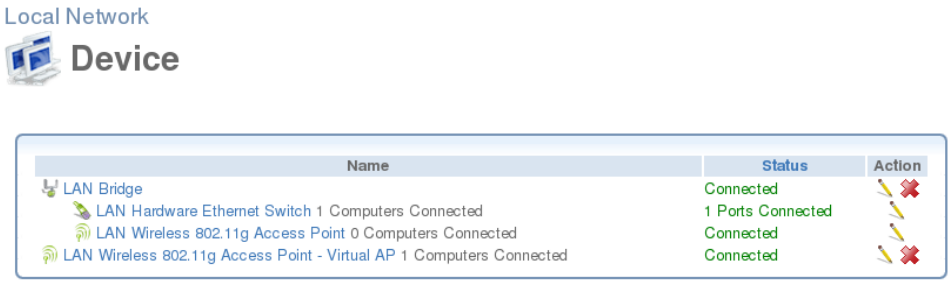


Figure 7.62. Network Devices

To view the virtual access point's properties, click its link or the action icon . The following screen appears.

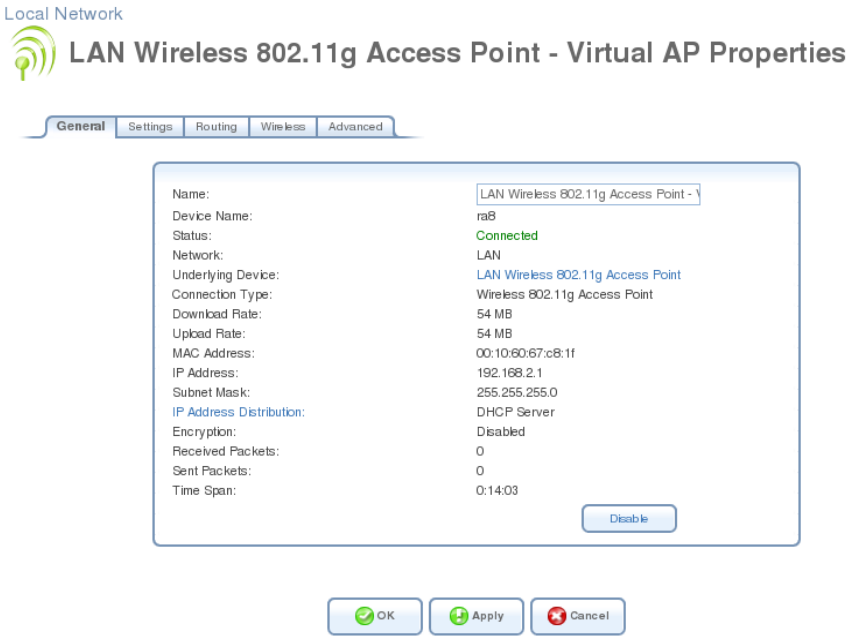


Figure 7.63. Virtual Access Point's Properties

To view its settings, click the screen's 'Settings' tab. The following screen appears.

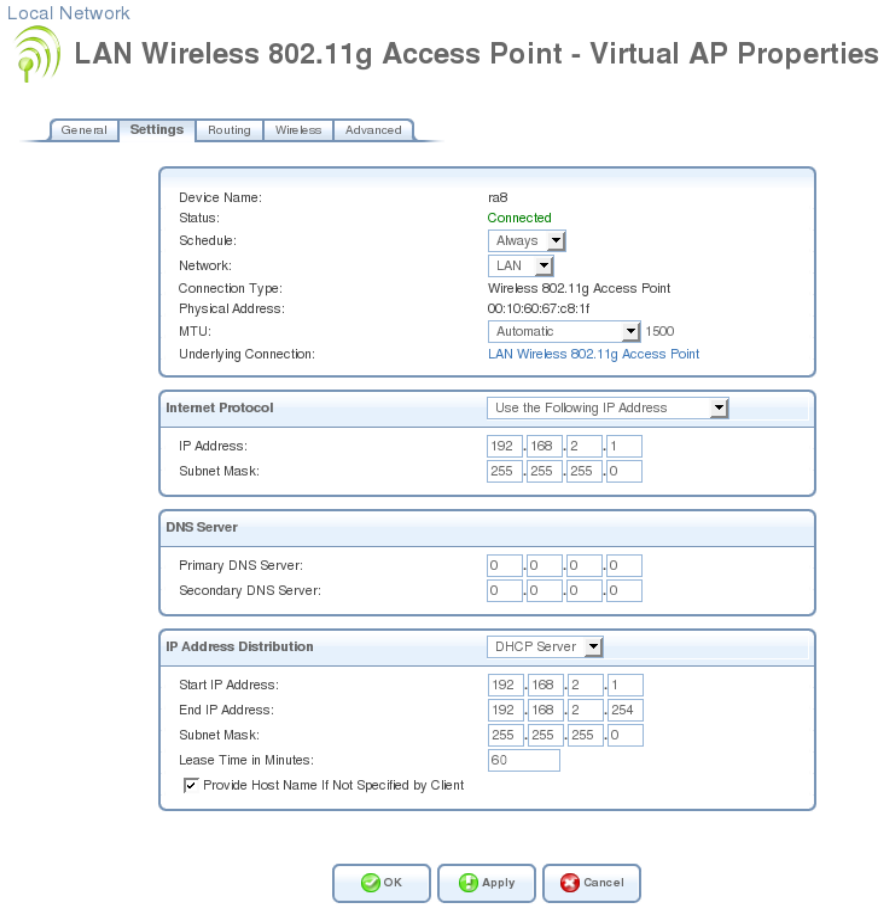


Figure 7.64. Virtual Access Point's Settings

A wireless client located in your area can see the "NationZone" SSID of OpenRG's virtual access point. When trying to connect to the Internet, this client is redirected to the NationZone authentication page.

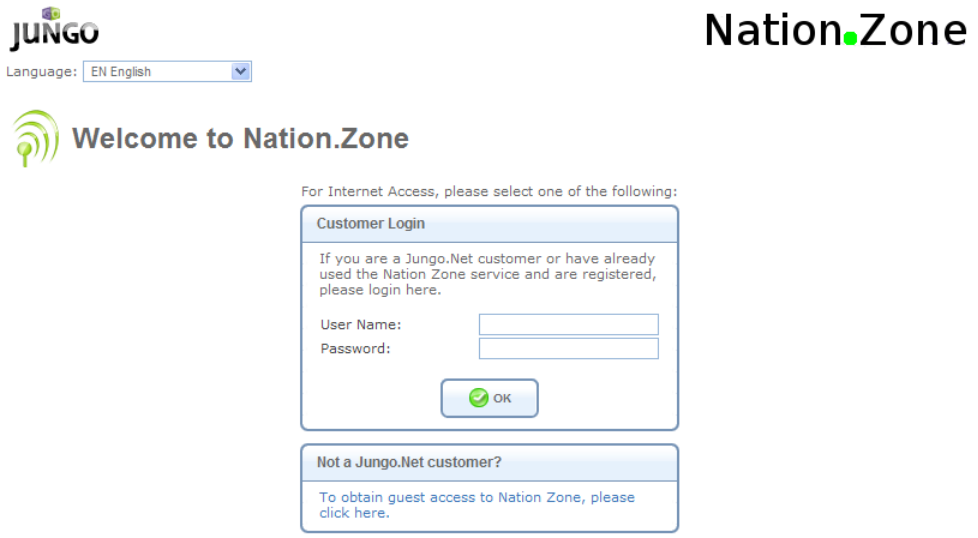

JUNGO
Language: EN English
Nation.Zone
Welcome to Nation.Zone
For Internet Access, please select one of the following:
Customer Login
If you are a Jungo.Net customer or have already used the Nation Zone service and are registered, please login here.
User Name:
Password:
OK
Not a Jungo.Net customer?
To obtain guest access to Nation Zone, please click here.

Figure 7.65. Login Page

To access this page and surf the Internet for free, the wireless client must have a Jungo.net account and a gateway on which the NationZone service is enabled. If the client's gateway supports NationZone, but this service has not been enabled yet, the following screen appears.

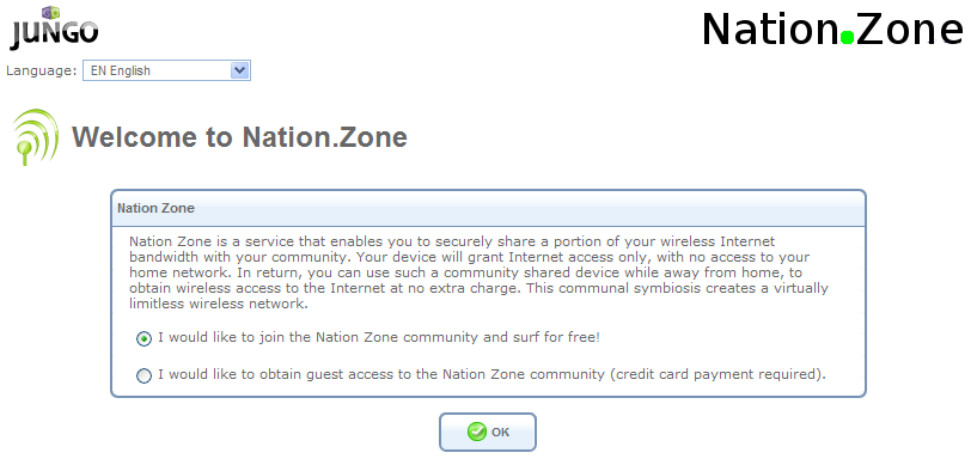

JUNGO
Language: EN English
Nation.Zone
Welcome to Nation.Zone
Nation Zone
Nation Zone is a service that enables you to securely share a portion of your wireless Internet bandwidth with your community. Your device will grant Internet access only, with no access to your home network. In return, you can use such a community shared device while away from home, to obtain wireless access to the Internet at no extra charge. This communal symbiosis creates a virtually limitless wireless network.
I would like to join the Nation Zone community and surf for free!
I would like to obtain guest access to the Nation Zone community (credit card payment required).
OK

Figure 7.66. Welcome Screen--Selecting AccessType

In this case, the client can either activate this service on the gateway and surf for free, or access the NationZone portal as a guest, after paying with a credit card. If the per-access payment option is selected, the following screen appears.

Figure 7.67. Welcome Screen--Payment Form

After entering the required contact information and the credit card details, the client must click 'OK' to confirm the service request.

Note: A password can be stored in the portal's database for automatic identification and payment in case of a future use of the service.

If the entered information is valid, the following page appears, and the client can surf the Internet through your OpenRG's WAN connection.

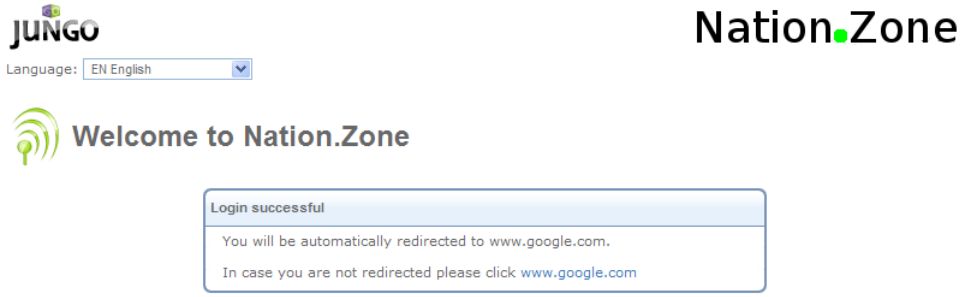


Figure 7.68. Login Successful

If a client's gateway is connected to the Jungo.net portal, but it does not support the NationZone service (the gateway does not have a wireless network device, or the firmware is not updated), the client can still obtain this service as follows:

1. When accessing the NationZone portal, the following screen appears.

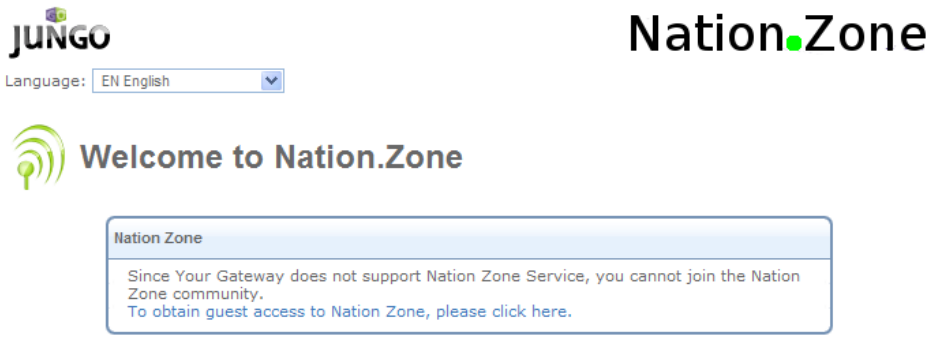

JUNGO
Nation.Zone
Language: EN English
Welcome to Nation.Zone
Nation Zone
Since Your Gateway does not support Nation Zone Service, you cannot join the Nation Zone community.
To obtain guest access to Nation Zone, please click here.

Figure 7.69. Welcome Screen--NationZone is Unsupported

2. To continue with the Internet access request, the client must click the following link: 'To obtain guest access to NationZone, please click here.' The payment form appears (see figure Figure 7.67).

3. After entering the required contact information and the credit card details, the client clicks 'OK' to confirm the service request and to start surfing the Internet.

Finally, if the wireless client does not have a Jungo.net account, the NationZone's guest access can be purchased by clicking its link in the **Not a Jungo.net Customer?** section of the NationZone authentication page. The payment form appears (see figure Figure 7.67). After having paid, the client obtains Internet access.

7.2.3.6. IP-PBX

The Jungo.net IP-PBX service assists you in setting up a private telephony switching system at your home or office, and configure it according to your needs. The service's registration wizard enables you to select and order the telephony equipment, to obtain a personal telephone number, and to configure your gateway's IP-PBX module accordingly. To register for the IP-PBX service in Jungo.net, perform the following:

1. Under the 'Services' tab, click the 'IP-PBX' link. The service's 'Overview' screen appears.

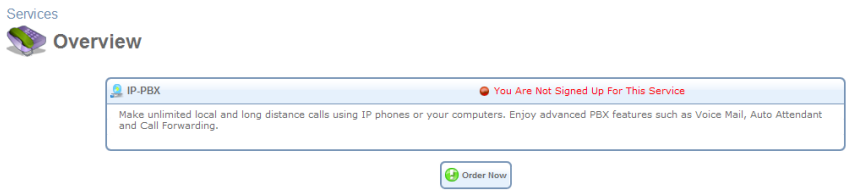

Services
Overview
IP-PBX
You Are Not Signed Up For This Service
Make unlimited local and long distance calls using IP phones or your computers. Enjoy advanced PBX features such as Voice Mail, Auto Attendant and Call Forwarding.
Order Now

Figure 7.70. IP-PBX Overview

2. Click the 'Order Now' button. The 'Order New Service' screen appears.

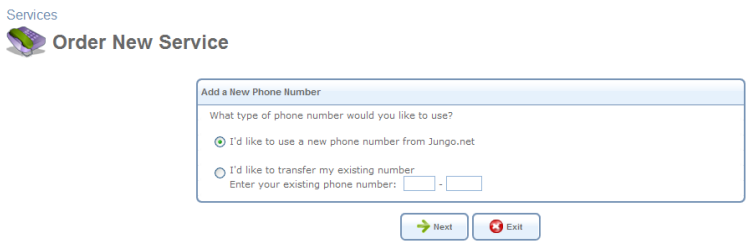

Services
Order New Service
Add a New Phone Number
What type of phone number would you like to use?
I'd like to use a new phone number from Jungo.net
I'd like to transfer my existing number
Enter your existing phone number:
Next
Exit

Figure 7.71. Order New Service

3. If you have not obtained a telephone number yet, select the first radio button to obtain one of the available numbers, offered by your service provider. In case you do have a number, select the second radio button, and enter your telephone number in the corresponding fields.

4. Click 'Next'. The following screen appears.

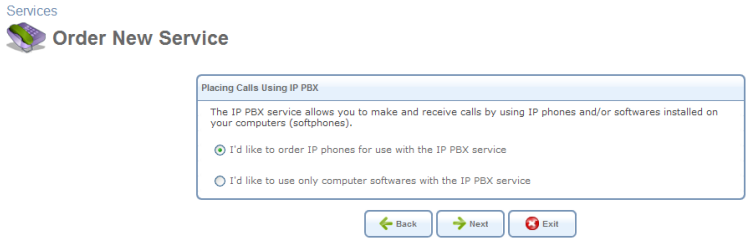

Services
Order New Service
Placing Calls Using IP PBX
The IP PBX service allows you to make and receive calls by using IP phones and/or softwares installed on your computers (softphones).
I'd like to order IP phones for use with the IP PBX service
I'd like to use only computer softwares with the IP PBX service
Back
Next
Exit

Figure 7.72. Select an Equipment Type

5. Select the equipment type you would like to use. It can be either IP phones or softphones.

6. Click 'Next' to proceed. If the IP phones option has been selected, the 'Order IP Phones' screen appears, where you can select the IP phones and specify their quantity.

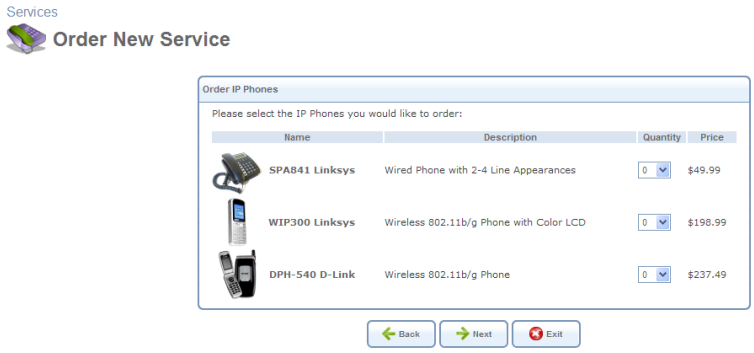


Figure 7.73. Order IP Phones

After clicking 'Next', the following order summary screen appears.

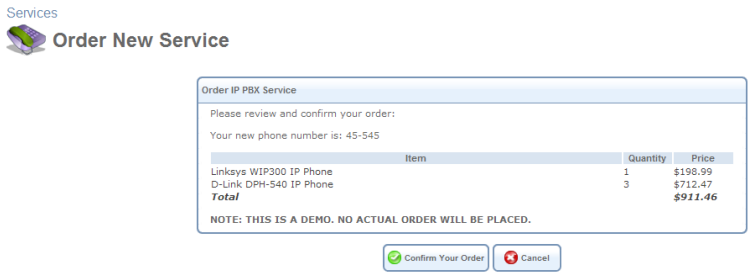


Figure 7.74. IP PBX with IP Phones Order

If you select the softphones option, clicking 'Next' leads to the following screen.

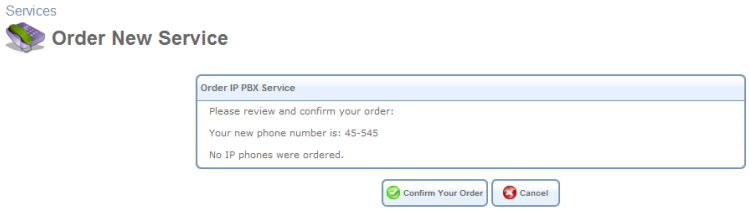


Figure 7.75. IP PBX with Softphones Order

7. In both cases, click the 'Confirm Your Order' button to complete the registration. Your gateway is now configured with the service settings. After completing the registration wizard, the following screen appears.

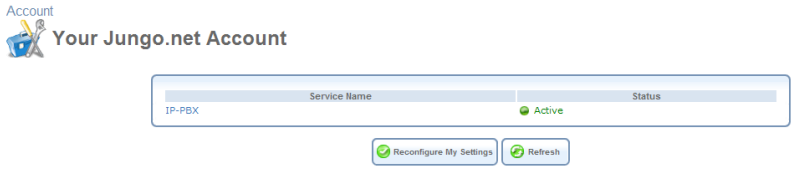


Figure 7.76. Your Jungo.net Account

Clicking the 'Reconfigure My Settings' button will reconfigure your gateway with the Jungo.net IP-PBX settings. This is helpful if you had changed the settings inappropriately, and your telephony system started to malfunction. Clicking the 'IP-PBX' link redirects you to the service's 'Overview' screen, which enables you to order additional phone numbers, purchase IP phones and download a free softphone.

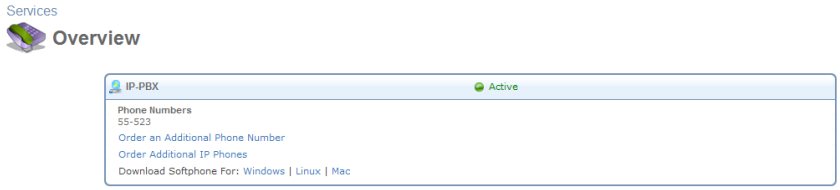


Figure 7.77. Activated Service Overview

To view the settings with which your gateway has been configured, proceed as follows:

1. Under the WBM's 'Services' tab, click 'IP-PBX'. The 'Extensions' screen appears.

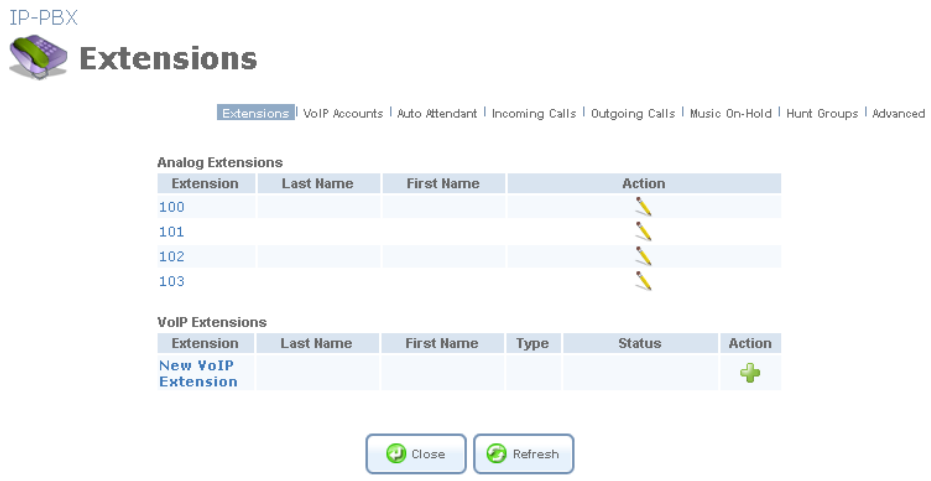


Figure 7.78. IP-PBX Extensions

This figure demonstrates the default state of the 'Extensions' screen. After you register for the service, Jungo.net configures your gateway with a hundred extensions.

2. Click the 'VoIP Accounts' link. The 'VoIP Account' screen appears, displaying your personal VoIP account name, which is by default your main telephone exchange number. This account has been opened on one of the SIP servers, with which your service provider works.

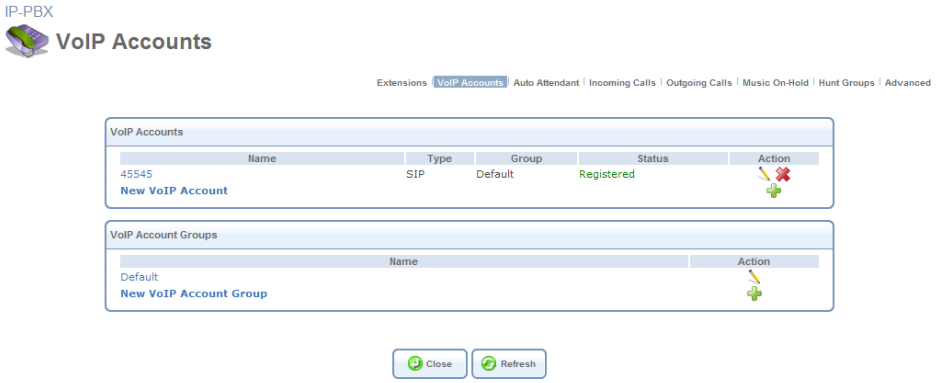


Figure 7.79. VoIP Account from Jungo.net

3. Click the VoIP account link or its action icon to view the account settings. The 'Edit VoIP Account' screen appears.

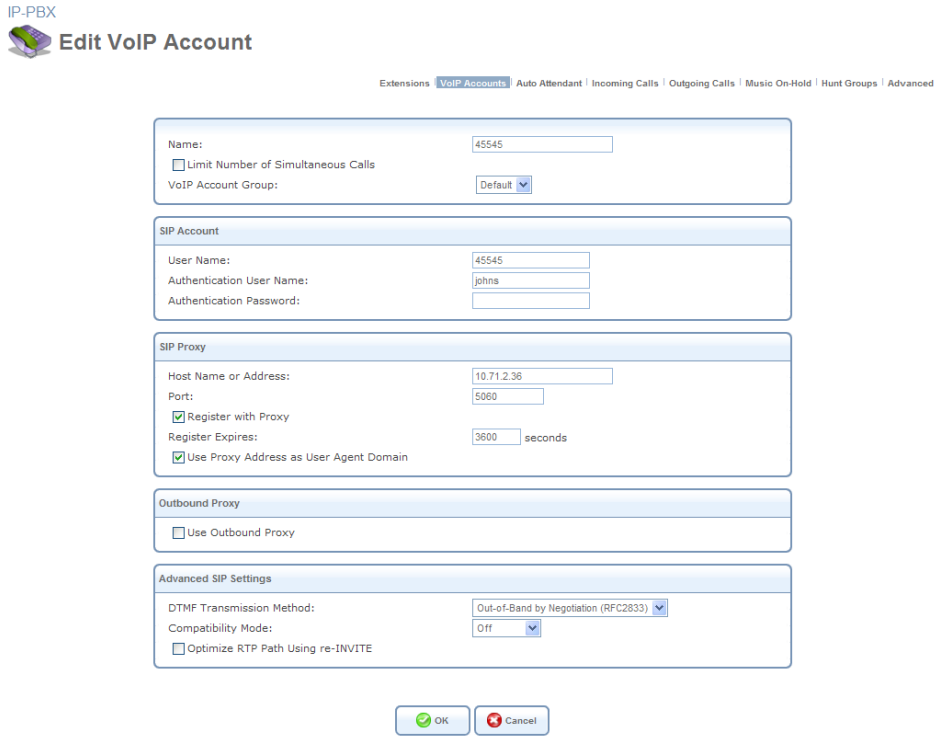


Figure 7.80. Edit VoIP Account

Jungo.net configures the gateway with the following settings:

- VoIP account name
- User name

- Authentication username
- Authentication password
- SIP proxy name or address
- SIP proxy port

If you would like to use IP phones, configure their connection to OpenRG as follows:

1. Connect a VoIP telephone to your gateway's LAN.
2. Configure its SIP proxy with 192.168.1.1 and its SIP user ID with an extension number of your choice. Refer to the device's documentation to learn how to do this.
1. Click 'OK' to save the settings.
1. Verify that the status of the extension changes to "Registered". Your VoIP device is now ready to be used.

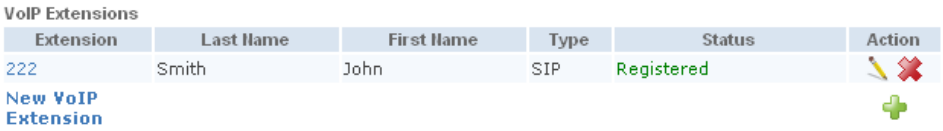


Figure 7.81. VoIP Extensions

If you have installed a softphone, configure it as follows:

1. Enter 192.168.1.1 in the softphone's SIP proxy field (called "Domain" in some softphones).
2. In the username field, enter the extension number you would like to assign to this softphone.
3. In the password field, enter your VoIP account's password.
4. Click 'OK' to save the settings.

7.3. Firewall

OpenRG's gateway security suite includes comprehensive and robust security services: Stateful Packet Inspection Firewall, user authentication protocols and password protection mechanisms. These features together allow users to connect their computers to the Internet and simultaneously be protected from the security threats of the Internet. The firewall, RG-FW OpenRG™ , the cornerstone of your gateway's security suite, has been exclusively tailored to the needs of the residential/office user and has been pre-configured to provide optimum security (see figure Figure 7.82).

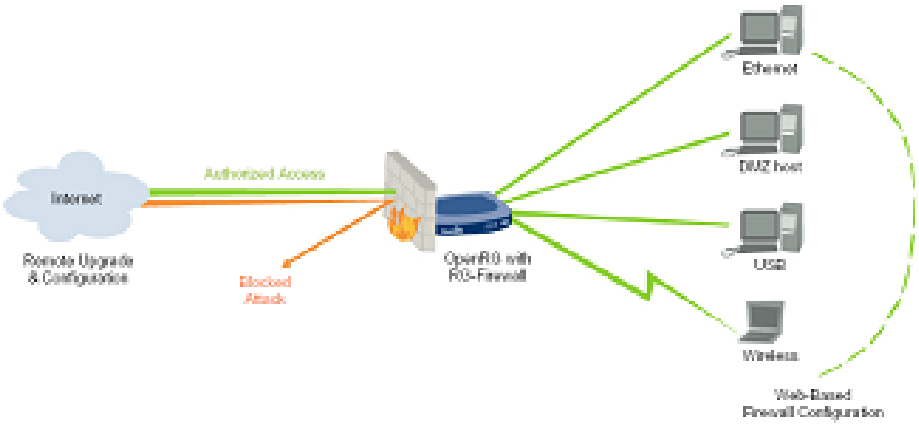


Figure 7.82. OpenRG's Firewall in Action

OpenRG's firewall provides both the security and flexibility that home and office users seek. It provides a managed, professional level of network security while enabling the safe use of interactive applications, such as Internet gaming and video-conferencing. Additional features, including surfing restrictions and access control, can also be easily configured locally by the user through a user-friendly Web-based interface, or remotely by a service provider. The OpenRG firewall supports advanced filtering, designed to allow comprehensive control over the firewall's behavior. You can define specific input and output rules, control the order of logically similar sets of rules and make a distinction between rules that apply to WAN and LAN network devices.
The WBM screens in the Security section feature the following:

- The 'General' screen allows you to choose the security level for the firewall (refer to Section 7.3.1).
- The 'Access Control' screen can be used to restrict access from the home network to the Internet (refer to Section 7.3.2).
- The 'Port Forwarding' screen can be used to enable access from the Internet to specified services provided by computers in the home network and special Internet applications (refer to Section 7.3.3).
- The 'DMZ Host' screen allows you to configure a LAN host to receive all traffic arriving at your gateway, which does not belong to a known session (refer to Section 7.3.4).
- The 'Port Triggering' screen allows you to define port triggering entries, to dynamically open the firewall for some protocols or ports (refer to Section 7.3.5).
- The 'Website Restrictions' screen allows you to block LAN access to a certain host or Web site on the Internet (refer to Section 7.3.6).
- The 'NAT' screen allows you to manually control the translation of network addresses and ports (refer to Section 7.3.7).
- The 'Connections' screen allows you to view all the connections that are currently open (refer to Section 7.3.8).
- 'Advanced Filtering' allows you to implicitly control the firewall setting and rules (refer to Section 7.3.9).
- 'Security Log' allows you to view and configure the firewall Log (refer to Section 7.3.10).

7.3.1. Overview

Use the 'General' screen to configure the gateway's basic security settings (see figure Figure 7.83).

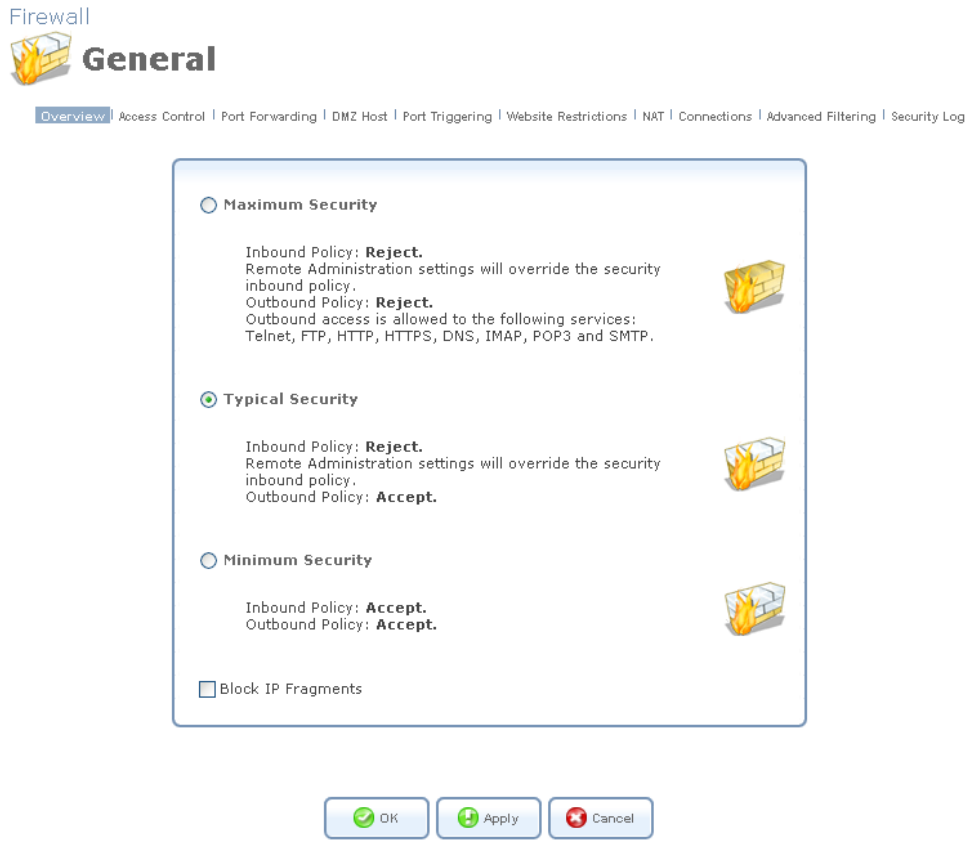

Firewall
General
Overview | Access Control | Port Forwarding | DMZ Host | Port Triggering | Website Restrictions | NAT | Connections | Advanced Filtering | Security Log
Maximum Security
Inbound Policy: Reject.
Remote Administration settings will override the security inbound policy.
Outbound Policy: Reject.
Outbound access is allowed to the following services:
Telnet, FTP, HTTP, HTTPS, DNS, IMAP, POP3 and SMTP.
Typical Security
Inbound Policy: Reject.
Remote Administration settings will override the security inbound policy.
Outbound Policy: Accept.
Minimum Security
Inbound Policy: Accept.
Outbound Policy: Accept.
Block IP Fragments
OK
Apply
Cancel

Figure 7.83. General

The firewall regulates the flow of data between the home network and the Internet. Both incoming and outgoing data are inspected and then either accepted (allowed to pass through OpenRG) or rejected (barred from passing through OpenRG) according to a flexible and configurable set of rules. These rules are designed to prevent unwanted intrusions from the outside, while allowing home users access to the Internet services that they require. The firewall rules specify what types of services available on the Internet may be accessed from the home network and what types of services available in the home network may be accessed from the Internet. Each request for a service that the firewall receives, whether originating in the Internet or from a computer in the home network, is checked against the set of firewall rules to determine whether the request should be allowed to pass through the firewall. If the request is permitted to pass, then all subsequent data associated with this request (a "session") will also be allowed to pass, regardless of its direction.
For example, when you point your Web browser to a Web page on the Internet, a request is sent out to the Internet for this page. When the request reaches OpenRG the firewall will identify the request type and origin---HTTP and a specific PC in your home network, in this case. Unless you have configured access control to block requests of this type from this computer, the firewall will allow this request to pass out onto the Internet (refer to Section 7.3.2 for more on setting access controls). When the Web page is returned from the Web server the firewall will associate it with this session and allow it to pass, regardless of whether HTTP access from the Internet to the home network is blocked or permitted. The important thing to note here is that it is the *origin of the request*, not subsequent responses to this request, that determines whether a session can be established or not.

You may choose from among three pre-defined security levels for OpenRG: Minimum, Typical, and Maximum (the default setting). The following table summarizes the behavior of OpenRG for each of the three security levels.

Security Level	**Requests Originating in the WAN (Incoming Traffic)**	**Requests Originating in the LAN (Outgoing Traffic)**
Maximum Security (Default)	*Blocked*: No access to home network from Internet, except as configured in the Port Forwarding,	*Limited*: By default, Only commonly-used services, such as Web-browsing and e-mail, are permitted

	DMZ host and Remote Access screens	
Typical Security	*Blocked*: No access to home network from Internet, except as configured in the Port Forwarding, DMZ host and Remote Access screens	*Unrestricted*: All services are permitted, except as configured in the Access Control screen
Minimum Security	*Unrestricted*: Permits full access from Internet to home network; all connection attempts permitted.	*Unrestricted*: All services are permitted, except as configured in the Access Control screen

Table 7.1. OpenRG's Firewall Security Levels

These services include Telnet, FTP, HTTP, HTTPS, DNS, IMAP, POP3 and SMTP. The list of allowed services at 'Maximum Security' mode can be edited in the Access Control page. Attention: Some applications (such as some Internet messengers and Peer-To-Peer client applications) tend to use these ports, if they cannot connect with their own default ports. When applying this behavior, these applications will not be blocked outbound, even at Maximum Security Level.

To configure OpenRG's security settings (see figure Figure 7.83):

1. Choose from among the three predefined security levels described in the table above. *Maximum Security* is the default setting.

Using the *Minimum Security* setting may expose the home network to significant security risks, and thus should only be used, when necessary, for short periods of time.

2. Check the 'Block IP Fragments' box in order to protect your home network from a common type of hacker attack that could make use of fragmented data packets to sabotage your home network. Note that VPN over IPSec and some UDP-based services make legitimate use of IP fragments. You will need to allow IP fragments to pass into the home network in order to make use of these select services.

3. Click the 'OK' button to save your changes.

7.3.2. Access Control

You may want to block specific computers within the home network (or even the whole network) from accessing certain services on the Internet. For example, you may want to prohibit one computer from surfing the Web, another computer from transferring files using FTP, and the whole network from receiving incoming e-mail. Access Control defines restrictions on the types of requests that may pass from the home network out to the Internet, and thus may block traffic flowing in both directions. It can also be used for allowing specific services when maximum security is configured. In the e-mail example given above, you may prevent computers in the home network from receiving e-mail by blocking their *outgoing* requests to POP3 servers on the Internet. There are numerous services you should consider blocking, such as popular game and file sharing servers. For example, if you want to make sure that your employees do not put your business at risk from illegally traded copyright files, you may want to block several popular P2P and file sharing applications.

- To allow or restrict services:

1. Select the 'Access Control' tab in the 'Security' management screen. The 'Access Control' screen appears.

Figure 7.84. Access Control

2. Click the 'New Entry' link. The 'Add Access Control Rule' screen appears.

Figure 7.85. Add Access Control Rule

3. The Address drop-down menu provides you the ability to specify the computer or group of computers for which you would like to apply the access control rule. You can select between any, a specific computer in your LAN, or 'User Defined'. If you choose the 'User Defined' option, the 'Edit Network Object' screen appears. Specifying an address is done by creating a 'Network Object'; to learn more about network objects, refer to Section 8.9.2

4. The Protocol drop-down menu menu lets you select or specify the type of protocol that will be used. Selecting the 'Show All Services' option will expand the list of available protocols. Select a protocol or add a new one using the 'User Defined' option. This will commence a sequence that will add a new *service*, representing the protocol. Refer to Section 8.9.1 in order to learn how to do so.

5. Select the 'Reply an HTML page to the blocked client' check-box to display the following message to the client: "Access Denied - this computer is not allowed to surf the WAN. Please contact your admin.". When this check-box is unselected, the client's packets will simply be ignored and he/she will not receive any notification.

6. The 'Schedule' drop-down menu allows you to define the time period during which this rule will take effect. By default, the rule will always be active. However, you can configure scheduler rules by selecting 'User Defined'. To learn how to configure scheduler rules, refer to Section 8.9.3.

7. Click the 'OK' button to save your changes. The 'Access Control' screen will display a summary of the rule that you just added.

Figure 7.86. Access Control Rule

You may edit the access control rule by modifying its entry under the 'Local Host' column in the 'Access Control' screen.

- To modify an entry:

1. Click the action icon for the rule. The 'Edit Access Control Rule' screen will appear (see Figure 7.87). This screen allows you to edit all the parameters that you configured when creating the access control rule.

Figure 7.87. Edit Access Control Rule

2. Click the 'OK' button to save your changes and return to the 'Access Control' screen.

You can disable an access control rule in order to make a service available without having to remove the rule from the 'Access Control' screen. This may be useful if you wish to make the service available only temporarily and expect that you will want to reinstate the restriction in the future.

- To temporarily disable a rule, clear the check box next to the service name.
- To reinstate it at a later time, simply reselect the check box.

- To remove a rule, click the action icon for the service. The service will be permanently removed.

Note: Please note that when Web Filtering is enabled, HTTP services cannot be blocked by Access Control.

7.3.3. Port Forwarding

In its default state, OpenRG blocks all external users from connecting to or communicating with your network. Therefore the system is safe from hackers who may try to intrude on the network and damage it. However, you may want to expose your network to the Internet in certain limited and controlled ways in order to enable some applications to work from the LAN (game, voice and chat applications, for example) and to enable Internet-access to servers in the home network. The Port Forwarding feature supports both of these functionalities. If you are familiar with networking terminology and concepts, you may have encountered this topic referred to as "Local Servers".
The 'Port Forwarding' screen lets you define the applications that require special handling by OpenRG. All you have to do is select the application's protocol and the local IP address of the computer that will be using or providing the service. If required, you may add new protocols in addition to the most common ones provided by OpenRG. For example, if you wanted to use a File Transfer Protocol (FTP) application on one of your PCs, you would simply select 'FTP' from the list and enter the local IP address or host name of the designated computer. All FTP-related data arriving at OpenRG from the Internet will henceforth be forwarded to the specified computer. Similarly, you can grant Internet users access to servers inside your home network, by identifying each service and the PC that will provide it. This is useful, for example, if you want to host a Web server inside your home network. When an Internet user points his/her browser to OpenRG's external IP address, the gateway will forward the incoming HTTP request to your Web server. With one external IP address (OpenRG's main IP address), different applications can be assigned to your LAN computers, however each type of application is limited to use one computer. For example, you can define that FTP will use address X to reach computer A and Telnet will also use address X to reach computer A, but attempting to define FTP to use address X to reach both computer A and B will fail. OpenRG therefore provides the ability to add additional public IP addresses to port forwarding rules, which you must first obtain from your ISP, and enter into the 'NAT IP Addresses Pool' (refer to Section 7.3.7). You will then be able to define FTP to use address X to reach computer A and address Y to reach computer B. Additionally, port forwarding enables you to redirect traffic to a different port instead of the one to which it was designated. Lets say, that you have a Web server running on your PC on port 8080 and you want to grant access to this server to anyone who accesses OpenRG via HTTP. To accomplish this, do the following:

- Define a port forwarding rule for the HTTP service, with the PC's IP or host name.
- Specify 8080 in the 'Forward to Port' field.

All incoming HTTP traffic will now be forwarded to the PC running the Web server on port 8080. When setting a port forwarding service, you must ensure that the port is not already in use by another application, which may stop functioning. A common example is when using SIP signaling in Voice over IP - the port used by the gateway's VoIP application (5060) is the same port on which port forwarding is set for LAN SIP agents. For more details, refer to Section 7.6.5.1.

Note: Some applications, such as FTP, TFTP, PPTP and H323, require the support of special specific Application Level Gateway (ALG) modules in order to work inside the home network. Data packets associated with these applications contain information that allows them to be routed correctly. An ALG is needed to handle these packets and ensure that they reach their intended destinations. OpenRG is equipped with a robust list of ALG modules in order to enable maximum functionality in the home network. The ALG is automatically assigned based on the destination port.

- To add a new port forwarding service:

1. Select the 'Port Forwarding' tab in the 'Security' management screen. The 'Port Forwarding' screen appears.

Figure 7.88. Port Forwarding

2. Click the 'New Entry' link. The 'Add Port Forwarding Rule' screen appears.

Figure 7.89. Add Port Forwarding Rule

3. Select the 'Specify Public IP Address' check box if you would like to apply this rule on OpenRG's non-default IP address, defined in the 'NAT' screen (refer to Section 7.3.7). The screen refreshes.

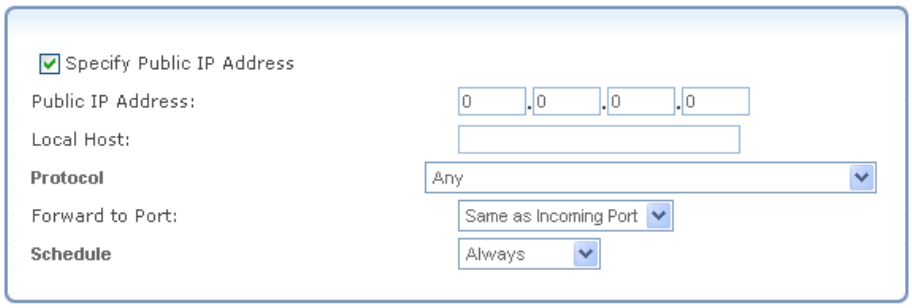


Figure 7.90. Specify Public IP Address

4. Enter the additional external IP address in the 'Public IP Address' field.

5. Enter the host name or IP address of the computer that will provide the service (the "server") in the 'Local Host' field. Note that unless an additional external IP address has been added, only one LAN computer can be assigned to provide a specific service or application.

6. The Protocol drop-down menu menu lets you select or specify the type of protocol that will be used. Selecting the 'Show All Services' option will expand the list of available protocols. Select a protocol or add a new one using the 'User Defined' option. This will commence a sequence that will add a new *service*, representing the protocol. Refer to Section 8.9.1 in order to learn how to do so.

7. By default, OpenRG will forward traffic to the same port as the incoming port. If you wish to redirect traffic to a different port, select the 'Specify' option. The screen will refresh, and an additional field will appear enabling you to enter the port number:

Figure 7.91. Forward to a Specific Port

8. The 'Schedule' drop-down menu allows you to define the time period during which this rule will take effect. By default, the rule will always be active. However, you can configure scheduler rules by selecting 'User Defined'. To learn how to configure scheduler rules, refer to Section 8.9.3.

9. Click the 'OK' button to save your changes. The 'Port Forwarding' screen will display a summary of the rule that you just added.

Figure 7.92. Port Forwarding Rule

You may edit the port forwarding rule by modifying its entry under the 'Local Host' column in the 'Port Forwarding' screen.

- To modify an entry:

1. Click the action icon for the rule. The 'Edit Port Forwarding Rule' screen will appear (see Figure 7.93). This screen allows you to edit all the parameters that you configured when creating the port forwarding rule.

Figure 7.93. Edit Port Forwarding Rule

2. Click the 'OK' button to save your changes and return to the 'Port Forwarding' screen.

You can disable a port forwarding rule in order to make a service unavailable without having to remove the rule from the 'Port Forwarding' screen. This may be useful if you wish to make the service unavailable only temporarily and expect that you will want to reinstate it in the future.

- To temporarily disable a rule, clear the check box next to the service name.
- To reinstate it at a later time, simply reselect the check box.
- To remove a rule, click the action icon for the service. The service will be permanently removed.

How many computers can use a service or play a game simultaneously? Well, the answer may be a bit confusing. All the computers on the network can use a specific service as clients simultaneously. Being a client means that the computer within the network initiates the connection--for example, opens an FTP connection with an FTP server on the Internet. But only one computer can serve as a server, meaning responding to requests from computers on the Internet. Assigning a specific computer as a server is done in the Port Forwarding section of Web-based management.

7.3.4. DMZ Host

The DMZ (Demilitarized) Host feature allows one local computer to be exposed to the Internet. Designate a DMZ host when:

- You wish to use a special-purpose Internet service, such as an on-line game or video-conferencing program, that is not present in the Port Forwarding list and for which no port range information is available.
- You are not concerned with security and wish to expose one computer to all services without restriction.

Warning: A DMZ host is not protected by the firewall and may be vulnerable to attack. Designating a DMZ host may also put other computers in the home network at risk. When designating a DMZ host, you must consider the security implications and protect it if necessary.

An incoming request for access to a service in the home network, such as a Web-server, is fielded by OpenRG. OpenRG will forward this request to the DMZ host (if one is designated) unless the service is being provided by

another PC in the home network (assigned in Port Forwarding), in which case that PC will receive the request instead.

- To designate a local computer as a DMZ Host:

  1. Select the 'DMZ Host' tab in the 'Security' management screen. The 'DMZ Host' screen appears.

Firewall
DMZ Host
Overview | Access Control | Port Forwarding | DMZ Host | Port Triggering | Website Restrictions | NAT | Connections | Advanced Filtering | Security Log
Allow a single LAN computer to be fully exposed to the Internet.
DMZ Host IP Address:
192
168
1
0
OK
Apply
Cancel

Figure 7.94. DMZ Host

  2. Enter the local IP address of the computer that you would like to designate as a DMZ host, and select the check-box. Note that only one LAN computer may be a DMZ host at any time.

  3. Click 'OK' to save the settings.

  You can disable the DMZ host so that it will not be fully exposed to the Internet, but keep its IP address recorded on the 'DMZ Host' screen. This may be useful if you wish to disable the DMZ host but expect that you will want to enable it again in the future.

- To disable the DMZ host so that it will not be fully exposed to the Internet, clear the check-box next to the DMZ IP designation, and click 'OK'.

- To reinstate it at a later time, simply reselect the check box.

7.3.5. Port Triggering

Port triggering can be used for dynamic port forwarding configuration. By setting port triggering rules, you can allow inbound traffic to arrive at a specific LAN host, using ports different than those used for the outbound traffic. This is called port triggering since the outbound traffic triggers to which ports inbound traffic is directed. For example, consider a gaming server that is accessed using UDP protocol on port 2222. The gaming server responds by connecting the user using UDP on port 3333 when starting gaming sessions. In such a case you must use port triggering, since this scenario conflicts with the following default firewall settings:

- The firewall blocks inbound traffic by default.

- The server replies to OpenRG's IP, and the connection is not sent back to your host, since it is not part of a session.

In order to solve this you need to define a Port Triggering entry, which allows inbound traffic on UDP port 3333, only after a LAN host generated traffic to UDP port 2222. This will result in accepting the inbound traffic from the gaming server, and sending it back to the LAN Host which originated the outgoing traffic to UDP port 2222. Select the 'Port Triggering' tab in the 'Security' management screen. The 'Port Triggering' screen will appear (see figure Figure 7.95). This screen will list all of the port triggering entries.

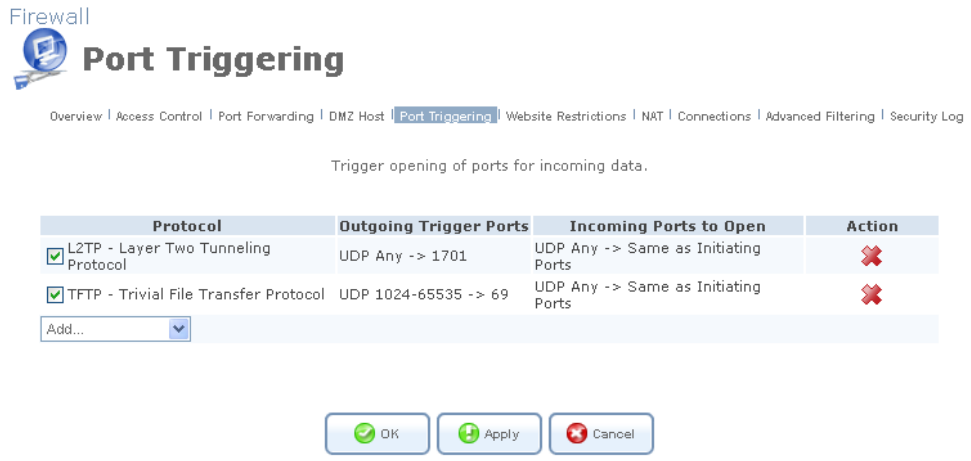

Firewall
Port Triggering
Overview | Access Control | Port Forwarding | DMZ Host | Port Triggering | Website Restrictions | NAT | Connections | Advanced Filtering | Security Log
Trigger opening of ports for incoming data.
Protocol
Outgoing Trigger Ports
Incoming Ports to Open
Action
L2TP - Layer Two Tunneling Protocol
UDP Any -> 1701
UDP Any -> Same as Initiating Ports
TFTP - Trivial File Transfer Protocol
UDP 1024-65535 -> 69
UDP Any -> Same as Initiating Ports
Add...
OK
Apply
Cancel

Figure 7.95. Port Triggering

Let's add an entry for the gaming example above: Figure 7.101

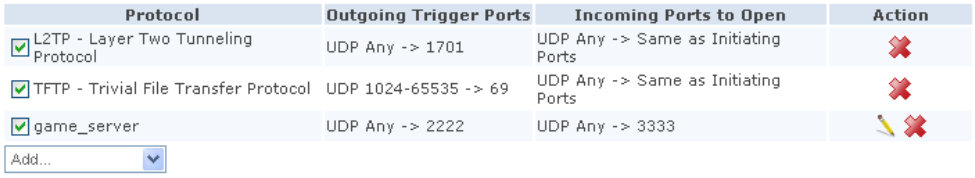


Figure 7.101. New Port Triggering Rule

1. Select the 'User Defined' option to add an entry. The 'Edit Port Triggering Rule' screen will appear (see figure Figure 7.96).

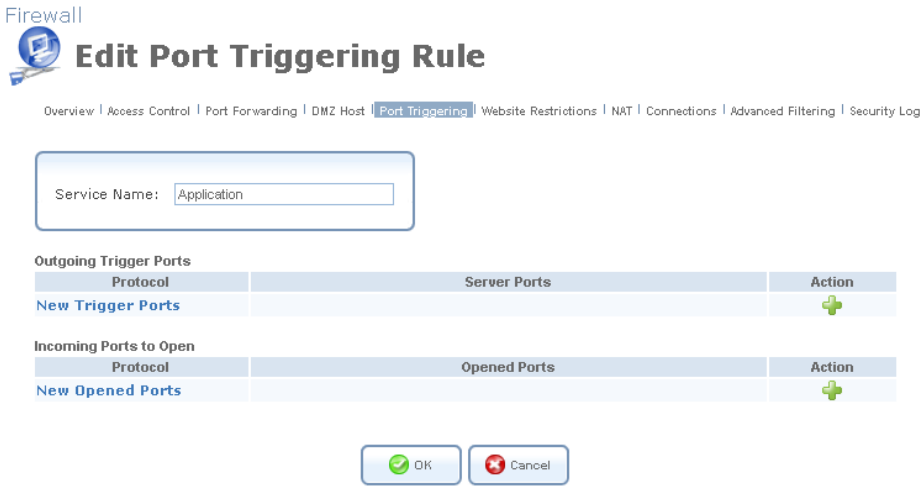


Figure 7.96. Edit Port Triggering Rule

2. Enter a name for the service (e.g. "game_server"), and click the 'New Trigger Ports' link. The 'Edit Service Server Ports' screen will appear (see figure Figure 7.97).

Firewall
Edit Service Server Ports
Overview | Access Control | Port Forwarding | DMZ Host | Port Triggering | Website Restrictions | NAT | Connections | Advanced Filtering | Security Log
Protocol
Other
Protocol Number:
0
OK
Cancel

Figure 7.97. Edit Service Server Ports

3. In the Protocol combo-box, select UDP. The screen will refresh, providing source and destination port options (see figure Figure 7.98).

4. Leave the Source Ports combo-box at its default "Any". In the Destination Ports combo-box, select "Single". The screen will refresh again, providing an additional field in which you should enter "2222" as the destination port.

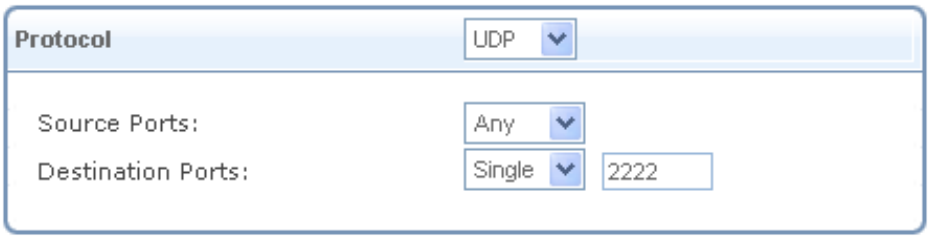


Figure 7.98. Edit Service Server Ports

5. Click 'OK' to save the settings.

6. Back in the 'Edit Port Triggering Rule' screen, click the 'New Opened Ports' link. The 'Edit Service Opened Ports' screen will appear (see figure Figure 7.99).

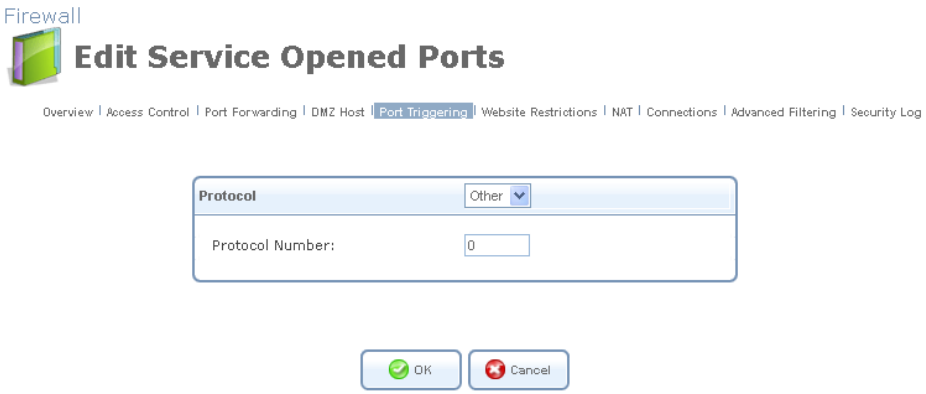

Firewall
Edit Service Opened Ports
Overview | Access Control | Port Forwarding | DMZ Host | Port Triggering | Website Restrictions | NAT | Connections | Advanced Filtering | Security Log
Protocol
Other
Protocol Number:
0
OK
Cancel

Figure 7.99. Edit Service Opened Ports

7. Similar to the trigger ports screen, select UDP as the protocol, leave the source port at "Any", and enter a 3333 as the single destination port (see figure Figure 7.100).

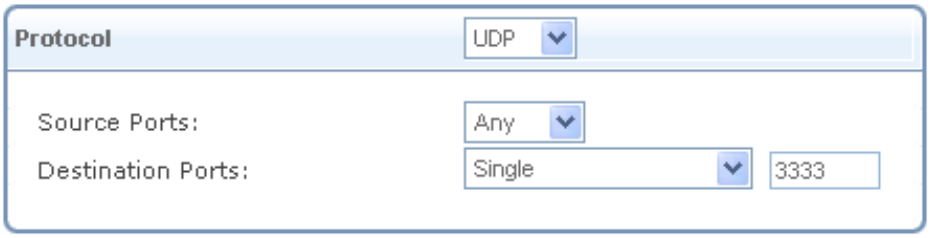


Figure 7.100. Edit Service Opened Ports

8. Click 'OK' to save the settings.

You can disable a port triggering rule without having to remove it from the 'Port Triggering' screen.

- To temporarily disable a rule, clear the check box next to the service name.
- To reinstate it at a later time, simply reselect the check box.
- To remove a rule, click the action icon for the service. The service will be permanently removed.

There may be a few default port triggering rules listed when you first access the port triggering screen. Please note that disabling these rules may result in impaired gateway functionality.

7.3.6. Website Restrictions

You may configure OpenRG to block specific Internet websites so that they cannot be accessed from computers in the home network. Moreover, restrictions can be applied to a comprehensive and automatically-updated table of sites to which access is not recommended.

- To block access to a website:

1. Click the 'Website Restrictions' tab in the 'Security' management screen.

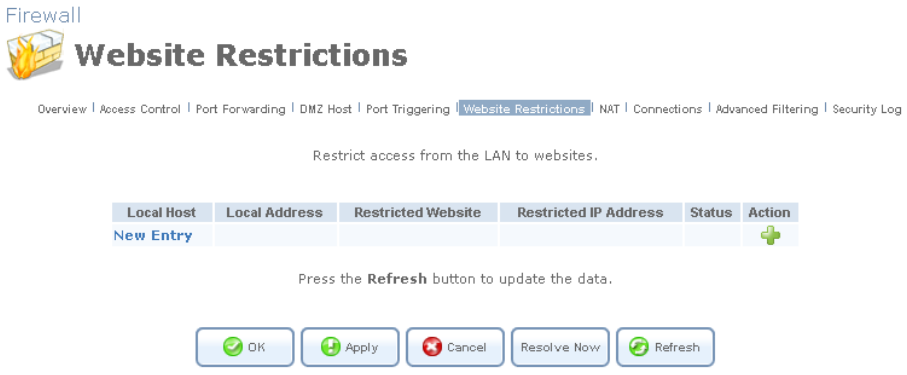


Figure 7.102. Website Restrictions

2. Click the 'New Entry' link. The 'Restricted Website' screen appears.

Firewall
Restricted Website
Overview | Access Control | Port Forwarding | DMZ Host | Port Triggering | Website Restrictions | NAT | Connections | Advanced Filtering | Security Log
Enter the website you wish to restrict:
Restricted Website:
Local Host
Any
Schedule
Always
OK
Cancel

Figure 7.103. Restricted Website

3. Enter the URL (or part of the URL) that you would like to make inaccessible from your home network (all Web pages within this URL will also be blocked). If the URL has multiple IP addresses, OpenRG will resolve all additional addresses and automatically add them to the restrictions table.

4. The Local Host drop-down menu provides you the ability to specify the computer or group of computers for which you would like to apply the website restriction. You can select between any, a specific computer in your LAN, or 'User Defined'. If you choose the 'User Defined' option, the 'Edit Network Object' screen appears. Specifying an address is done by creating a 'Network Object'; to learn more about network objects, refer to Section 8.9.2

5. The 'Schedule' drop-down menu allows you to define the time period during which this rule will take effect. By default, the rule will always be active. However, you can configure scheduler rules by selecting 'User Defined'. To learn how to configure scheduler rules, refer to Section 8.9.3.

6. Click 'OK' to save the settings.

7. Click the 'Refresh' button to update the status if necessary. If the site is successfully located then 'Resolved' will appear in the status bar, otherwise 'Hostname Resolution Failed' will appear. In case OpenRG fails to locate the website, do the following:

    a. Use a Web browser to verify that the website is available. If it is, then you probably entered the website address incorrectly.

    b. If the website is not available, return to the 'Website Restrictions' screen at a later time and click the 'Resolve Now' button to verify that the website can be found and blocked by OpenRG.

You may edit the website restriction by modifying its entry under the 'Local Host' column in the 'Website Restrictions' screen.

- To modify an entry:

    1. Click the action icon for the restriction. The 'Restricted Website' screen appears (see Figure 7.103). Modify the website address, group or schedule as necessary.

    2. Click the 'OK' button to save your changes and return to the 'Website Restrictions' screen.

- To ensure that all current IP addresses corresponding to the restricted websites are blocked:

    1. Click the 'Resolve Now' button. OpenRG will check each of the restricted website addresses and ensure that all IP addresses at which this website can be found are included in the IP addresses column.

You can disable a restriction in order to make a website available again without having to remove it from the 'Website Restrictions' screen. This may be useful if you wish to make the website available only temporarily and expect that you will want to block it again in the future.

- To temporarily disable a rule, clear the check box next to the service name.
- To reinstate it at a later time, simply reselect the check box.
- To remove a rule, click the action icon for the service. The service will be permanently removed.

7.3.7. Network Address Translation (NAT)

OpenRG features a configurable Network Address Translation (NAT) and Network Address Port Translation (NAPT) mechanism, allowing you to control the network addresses and ports of packets routed through your gateway. When enabling multiple computers on your network to access the Internet using a fixed number of public IP addresses, you can statically define which LAN IP address will be translated to which NAT IP address and/or ports.
By default, OpenRG operates in NAPT routing mode (see section Section 8.4.7.3). However, you can control your network translation by defining static NAT/NAPT rules. Such rules map LAN computers to NAT IP addresses. The NAT/NAPT mechanism is useful for managing Internet usage in your LAN, or complying with various application demands. For example, you can assign your primary LAN computer with a single NAT IP address, in order to assure its permanent connection to the Internet. Another example is when an application server with which you wish to connect, such as a security server, requires that packets have a specific IP address -- you can define a NAT rule for that address.

7.3.7.1. Configuration

Click the 'NAT' tab in the 'Security' management screen. The 'NAT' screen will appear (see figure Figure 7.104).

Figure 7.104. Network Address Translation

Before configuring NAT/NAPT rules, you must first enter the additional public IP addresses obtained from your ISP as your NAT IP addresses, in the 'NAT IP Addresses Pool' section. The primary IP address used by the WAN device for dynamic NAPT should not be added to this table. To add a NAT IP address, click the 'New IP Address' link. The 'Edit Item' screen will appear (see figure Figure 7.105).

Figure 7.105. Edit Item

Select between IP address, subnet or range in the 'Network Object Type' combo box, and enter the information respectively. To add a new NAT/NAPT rule, click the 'New Entry' link in the 'NAT/NAPT Rule Sets' section. The 'Add NAT/NAPT Rule' screen will appear (see figure Figure 7.106).

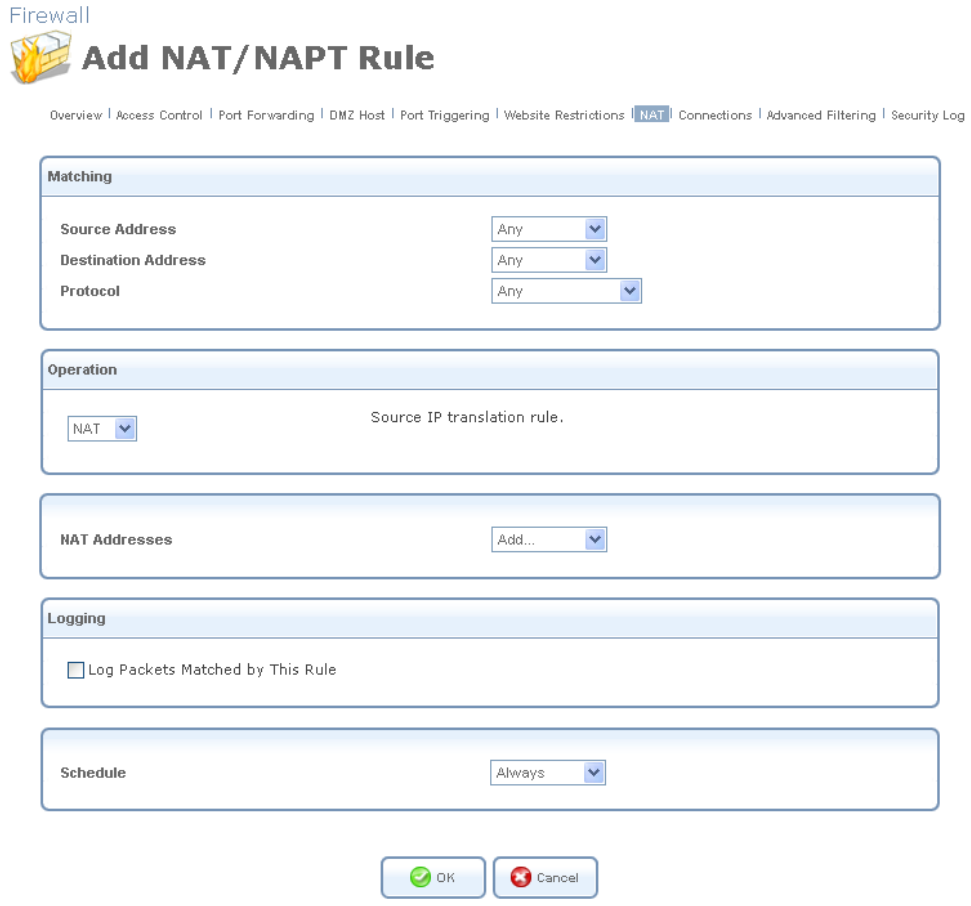


Figure 7.106. Add NAT/NAPT Rule

This screen is divided into two main sections, 'Matching' and 'Operation'. The 'Matching' section defines the LAN addresses to be translated to the external addresses, which are defined in the 'Operation' section.

Matching Use this section to define the rule's conditions, which are the LAN computer's parameters to be matched.

Source Address The source address of packets sent or received from the network object. The combo-box displays all the host names or IP addresses of currently connected LAN computers, as well as the options 'Any'

and 'User Defined'. Select an address from the list, or 'Any' to apply the rule on all computers. If you would like add a new address, select the 'User Defined' option in the combo-box. This will commence a sequence that will add a new *network object*, representing the LAN computer. Please refer to section Section 8.9.2 in order to learn how to do so.

Destination Address The destination address of packets sent or received from the network object. This address can be configured in the same manner as the source address. This entry enables further filtration of the packets.

Protocol You may also specify a traffic protocol. Selecting the 'Show All Services' option in the combo-box will expand the list of available protocols. Select a protocol or add a new one using the 'User Defined' option. This will commence a sequence that will add a new *service*, representing the protocol. Please refer to section Section 8.9.1 in order to learn how to do so.

Operation Use this section to define the operation that will be applied on the IP addresses matching the criteria defined above. The operations available are NAT or NAPT. Selecting each from the combo box will refresh the screen accordingly.

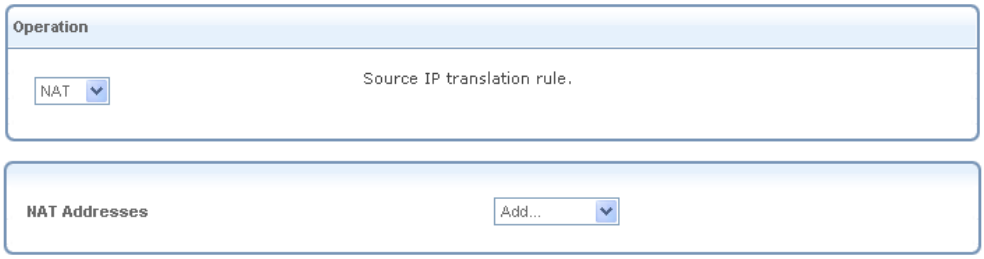


Figure 7.107. Add NAT Rule

NAT Addresses The NAT address into which the original IP address will be translated. The combo box displays all of your available NAT addresses/ranges, from which you can select an entry. If you would like to add a single address or a sub-range from the given pool/range, select the 'User Defined' option in the combo box. Similarly, this will commence a sequence that will add a new network object.

Logging Monitor the rule:

Log Packets Matched by This Rule Check this check box to log the first packet from a connection that was matched by this rule.

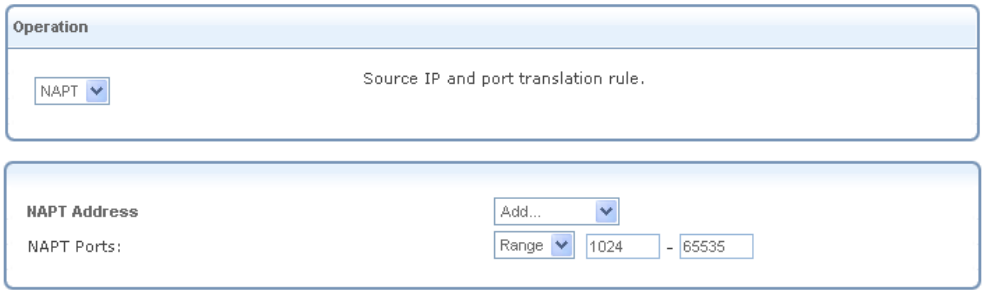


Figure 7.108. Add NAPT Rule

NAPT Address The NAPT address into which the original IP address will be translated. The combo box displays all of your available NAPT addresses/ranges, from which you can select an entry. If you would like to add a single address or a sub-range from the given pool/range, select the 'User Defined' option in the combo box. Similarly, this will commence a sequence that will add a new network object. Note, however, that in this case the network object may only be an IP address, as NAPT is port-specific.

NAPT Ports Specify the port(s) of the IP address into which the original IP address will be translated. Enter a single port or select 'Range' in the combo box. The screen will refresh, enabling you to enter a range of ports (see figure Figure 7.109).

Figure 7.109. Add NAPT Rule

Logging Monitor the rule:

Log Packets Matched by This Rule Check this check box to log the first packet from a connection that was matched by this rule.

Schedule By default, the rule will always be active. However, you can configure scheduler rules by selecting 'User Defined', in order to define time segments during which the rule may be active. To learn how to configure scheduler rules please refer to section Section 8.9.3.

7.3.7.2. Using NAT/NAPT

This section demonstrates the NAT/NAPT usage and capabilities, by creating several rules and observing their implementation.

7.3.7.3. Adding NAT/NAPT IP Addresses

In the following examples, LAN IP addresses are marked 192.168.1.X, while NAT addresses are marked 192.168.71.X. Assuming your obtained public IP addresses are **192.168.71.12 through 192.168.71.20** , add them as NAT IP addresses to the WAN Ethernet settings, as follows:

Figure 7.112. NAT IP Addresses

1. Click the 'NAT' tab in the 'Security' management screen. The 'NAT' screen will appear (see figure Figure 7.104).

2. Click the 'New IP Address' link in the 'NAT IP Addresses Pool' section. The 'Edit Item' screen will appear (see figure Figure 7.110).

3. Select the IP address option and enter 192.168.71.12.

Figure 7.110. Edit Item

4. Click 'OK' to save the settings.

5. Click the 'New IP Address' link again to enter the rest of the addresses. This sequence is for demonstration purposes; you may enter your public IP addresses in the method that suits you.

6. Select the IP range option and enter 192.168.71.13 through 192.168.71.20.

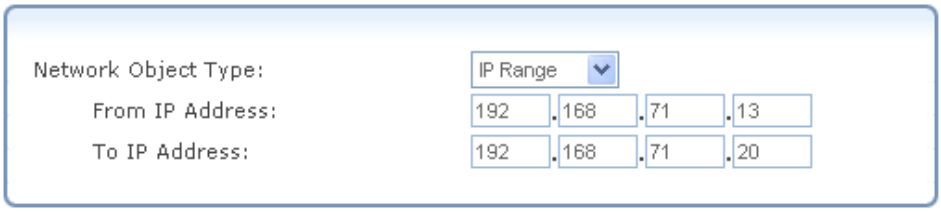


Figure 7.111. Edit Item

7. Click 'OK' to save the settings.

8. Click 'OK' to save the settings.

7.3.7.4. Defining NAT/NAPT Rules

You can now add NAT/NAPT rules based on these IP addresses. Click the 'New Entry' link in the 'NAT/NAPT Rule Sets' section. The 'Add NAT/NAPT Rule' screen will appear (see figure Figure 7.113).

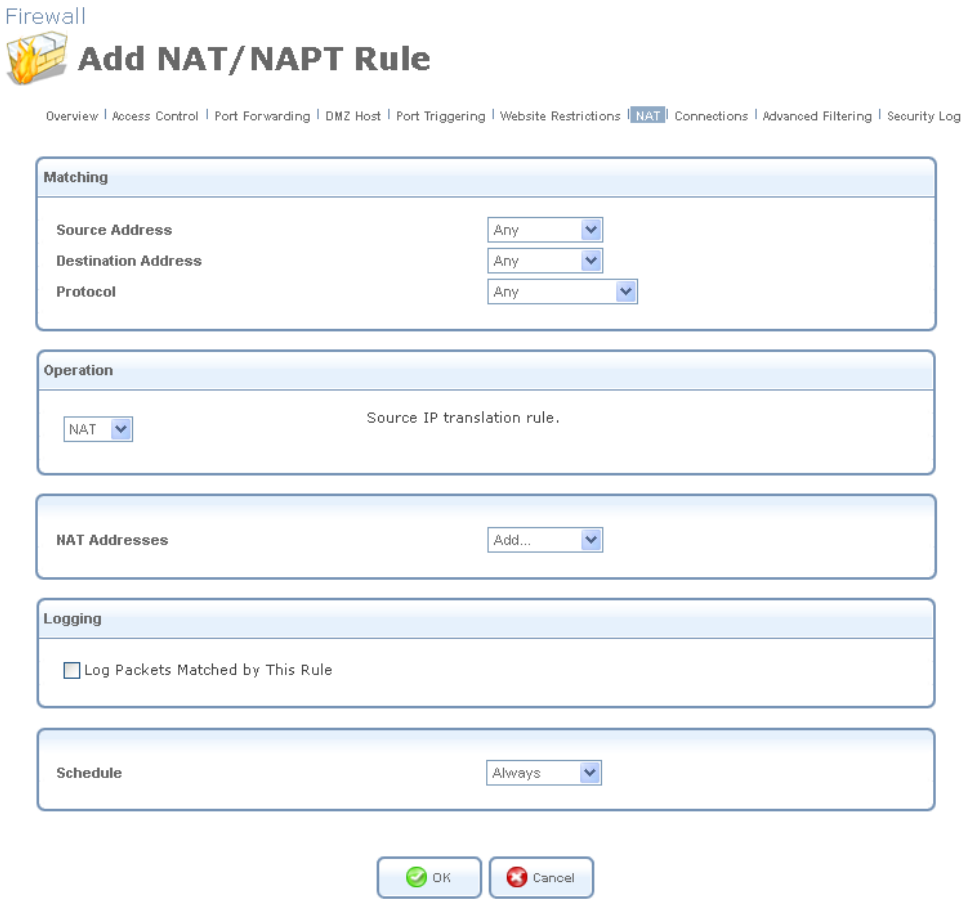


Figure 7.113. Add NAT/NAPT Rule

Create the following NAT/NAPT rules:

1. Translate the address 192.168.1.10 to 192.168.71.12. In this example we assume that LAN addresses (192.168.1.X) are not yet connected, therefore do not appear as combo box options, and network objects must be created in order to represent them.

    1. Select 'User Defined' in the 'Source Address' combo box. The 'Edit Network Object' screen will appear (see figure Figure 7.114).

Figure 7.114. Edit Network Object

2. Click 'New Entry'. The 'Edit Item' screen will appear (see figure Figure 7.115).
3. Select 'IP Address' in the 'Network Object Type' combo box, and enter 192.168.1.10.

Figure 7.115. Edit Item

4. Click 'OK' to save the settings.
5. Click 'OK' once more in the 'Edit Network Object' screen.
6. Back in the 'Add NAT/NAPT Rule' screen, select the '192.168.71.12' option in the 'NAT Addresses' combo box. The screen will refresh, adding this address as a NAT IP address.
7. Click 'OK' to save the settings.

This NAT rule will be displayed in the 'NAT' screen:

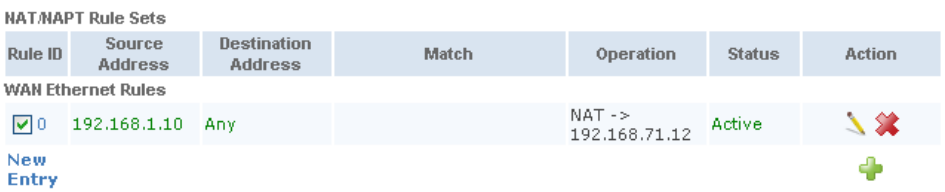


Figure 7.116. NAT/NAPT Rule Sets

This rule translates one LAN IP address to one NAT IP address, meaning that this LAN computer will have WAN access at any time. The status is therefore set to "Active".

2. Translate the range 192.168.1.11--192.168.1.15 to 192.168.71.12--192.168.71.15. Define this NAT rule in the same manner depicted above, with the exception of selecting 'IP Range' (instead of 'IP Address') as the network object type. Since both ranges are not predefined (no such combo box options), network objects must be created in order to represent them, using the 'User Defined' option. The rule will be displayed in the 'NAT' screen:

NAT/NAPT Rule Sets

Rule ID	Source Address	Destination Address	Match	Operation	Status	Action
WAN Ethernet Rules						
0	192.168.1.10	Any		NAT -> 192.168.71.12	Active	
1	192.168.1.11 - 192.168.1.15	Any		NAT -> 192.168.71.12 - 192.168.71.15	Active	
New Entry						

Figure 7.117. NAT/NAPT Rule Sets

This rule translates five new LAN IP addresses to four NAT IP addresses, which would normally mean that only four of the five LAN computers may have WAN access at the same time. However, note that the NAT address 192.168.71.12 is already in use by the first rule. OpenRG will therefore allow these five LAN computers to use only the three remaining IP addresses: 71.13, 71.14 and 71.15. The status is therefore set to "Active".

3. Translate the range 192.168.1.21--192.168.1.25 to 192.168.71.13--192.168.71.14. Define this NAT rule in the same manner depicted above. The following attention message will be displayed:

Attention

NAT/NAPT configuration: IP conflicts between this rule and previous NAT/NAPT rules

Press **OK** to confirm.

Figure 7.118. Attention

Click 'OK'. The rule will be displayed in the 'NAT' screen:

NAT/NAPT Rule Sets

Rule ID	Source Address	Destination Address	Match	Operation	Status	Action
WAN Ethernet Rules						
0	192.168.1.10	Any		NAT -> 192.168.71.12	Active	
1	192.168.1.11 - 192.168.1.15	Any		NAT -> 192.168.71.12 - 192.168.71.15	Active	
2	192.168.1.21 - 192.168.1.25	Any		NAT -> 192.168.71.13 - 192.168.71.14	Error	
New Entry						

Figure 7.119. NAT/NAPT Rule Sets

This rule translates five new LAN IP addresses to two NAT IP addresses, both of which are already in use by the second rule. OpenRG is therefore unable to resolve this situation and the rule's status is set to "Error". Notice that had this rule been defined as the second rule, all three rules would be valid. This is because the NAT address 192.168.71.15 would still be available for rule number 1. This can easily be amended: you can use the green arrow icons to move a rule entry up or down, changing its priority respectively. Click this rule's action icon once. All rules will now be set to "Active" (see figure Figure 7.120).

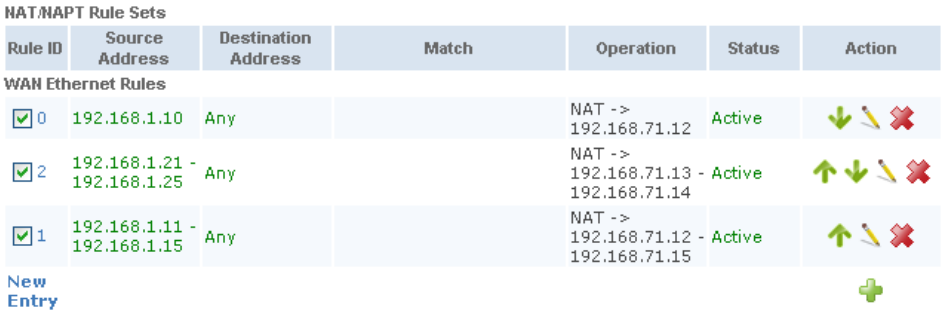


Figure 7.120. NAT/NAPT Rule Sets

Note: Rule number 1 now maps five LAN addresses to one NAT address. OpenRG subtracts all previously used NAT addresses, requested by previous rules, from the requested NAT addresses of the current rule. The requested range of addresses does not determine how many will be available; the number of available addresses is determined by previous rules configuration and order. Rules will appear as "Active" even if they only have one usable NAT address.

4. Translate the address 192.168.1.5 to 192.168.71.16 **ports** 1024-1050. Define this NAPT rule in the same manner depicted above, with the following exception:

   1. Select the 'NAPT' option in the 'Operation' section combo box. The screen will refresh:

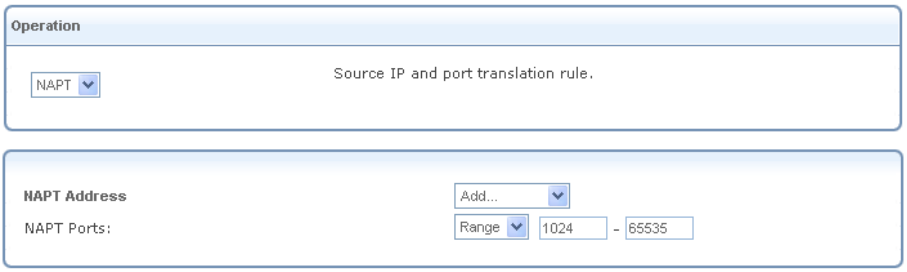


Figure 7.121. Add NAPT Rule

   2. Add a NAPT address by selecting the 'User Defined' option.

   3. Enter 1024-1050 as the range of ports in the 'NAPT Ports' section.

   4. Click 'OK' to save the settings.

   The rule will be displayed in the 'NAT' screen:

NAT/NAPT Rule Sets

Rule ID	Source Address	Destination Address	Match	Operation	Status	Action
WAN Ethernet Rules						
0	192.168.1.10	Any		NAT -> 192.168.71.12	Active	
2	192.168.1.21 - 192.168.1.25	Any		NAT -> 192.168.71.13 - 192.168.71.14	Active	
1	192.168.1.11 - 192.168.1.15	Any		NAT -> 192.168.71.12 - 192.168.71.15	Active	
3	192.168.1.5	Any		NAPT -> 192.168.71.16 ports 1024-1050	Active	
New Entry						

Figure 7.122. NAT/NAPT Rule Sets

This rule translates a LAN IP address to a NAT IP address with specific ports. Its status is set to "Active".

5. Translate the address 192.168.1.6 to 192.168.71.16 ports 1024-1100. Define this NAPT rule in the same manner depicted above. The rule will be displayed in the 'NAT' screen:

NAT/NAPT Rule Sets

Rule ID	Source Address	Destination Address	Match	Operation	Status	Action
WAN Ethernet Rules						
0	192.168.1.10	Any		NAT -> 192.168.71.12	Active	
2	192.168.1.21 - 192.168.1.25	Any		NAT -> 192.168.71.13 - 192.168.71.14	Active	
1	192.168.1.11 - 192.168.1.15	Any		NAT -> 192.168.71.12 - 192.168.71.15	Active	
3	192.168.1.5	Any		NAPT -> 192.168.71.16 ports 1024-1050	Active	
4	192.168.1.6	Any		NAPT -> 192.168.71.16 ports 1024-1100	Active	
New Entry						

Figure 7.123. NAT/NAPT Rule Sets

This rule translates a LAN IP address to a NAT IP address with ports 1024-1100. However, only ports 1051-1100 will be used for this LAN computer, as ports 1024-1050 are already in use by the preceding rule. The status is set to "Active".

Every new NAT/NAPT rule is verified in relation to preceding rules. Rules are prioritized according to the order in which they are defined. As long as at least one unused IP address (or port) is available, the rule will be accepted. However, as seen in the examples above, not all addresses in the range defined may be available for computers in in that rule; some may already be in use by other rules. OpenRG automatically calculates the relationships between rules, narrowing down the address ranges if needed, and thus provides placability for user input. The verification performed by OpenRG is as follows:

- NAT rule Verifies whether the IP address is already in use by another NAT/NAPT rule.
- NAPT rule

  1. Verifies whether the port is already in use by another NAPT rule activated on the same IP address.
  2. Verifies whether the IP address is already in use by another NAT rule.

7.3.8. Connections

The connection list displays all the connections that are currently open, as well as various details and statistics.

You can use this list to close undesired connections by clicking their action icon s. The basic display includes the name of the protocol, the different ports it uses, and the direction in which the connection was initiated.

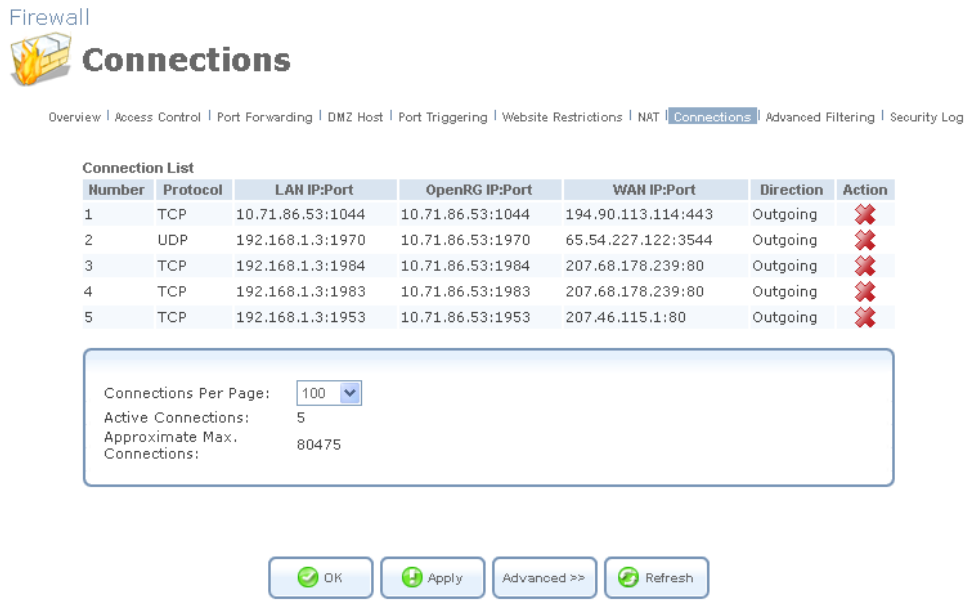

Firewall
Connections
Overview | Access Control | Port Forwarding | DMZ Host | Port Triggering | Website Restrictions | NAT | Connections | Advanced Filtering | Security Log
Connection List
Number Protocol LAN IP:Port OpenRG IP:Port WAN IP:Port Direction Action
1 TCP 10.71.86.53:1044 10.71.86.53:1044 194.90.113.114:443 Outgoing
2 UDP 192.168.1.3:1970 10.71.86.53:1970 65.54.227.122:3544 Outgoing
3 TCP 192.168.1.3:1984 10.71.86.53:1984 207.68.178.239:80 Outgoing
4 TCP 192.168.1.3:1983 10.71.86.53:1983 207.68.178.239:80 Outgoing
5 TCP 192.168.1.3:1953 10.71.86.53:1953 207.46.115.1:80 Outgoing
Connections Per Page: 100
Active Connections: 5
Approximate Max. Connections: 80475
OK
Apply
Advanced >>
Refresh

Figure 7.124. Connection List

Click 'Advanced' to display the following details:

- The connection's time-to-live
- The number of kilo-bytes and packets received and transmitted
- The device type
- The routing mode

Use the 'Connections Per Page' combo box to select the number of connections to display at once. The 'Approximate Max. Connections' value represents the amount of additional concurrent connections possible.

7.3.9. Advanced Filtering

Advanced filtering is designed to allow comprehensive control over the firewall's behavior. You can define specific input and output rules, control the order of logically similar sets of rules and make a distinction between rules that apply to WAN and LAN devices.
To view OpenRG's advanced filtering options, click 'Advanced Filtering' under the 'Firewall' tab in the 'Services' screen. The 'Advanced Filtering' screen appears:

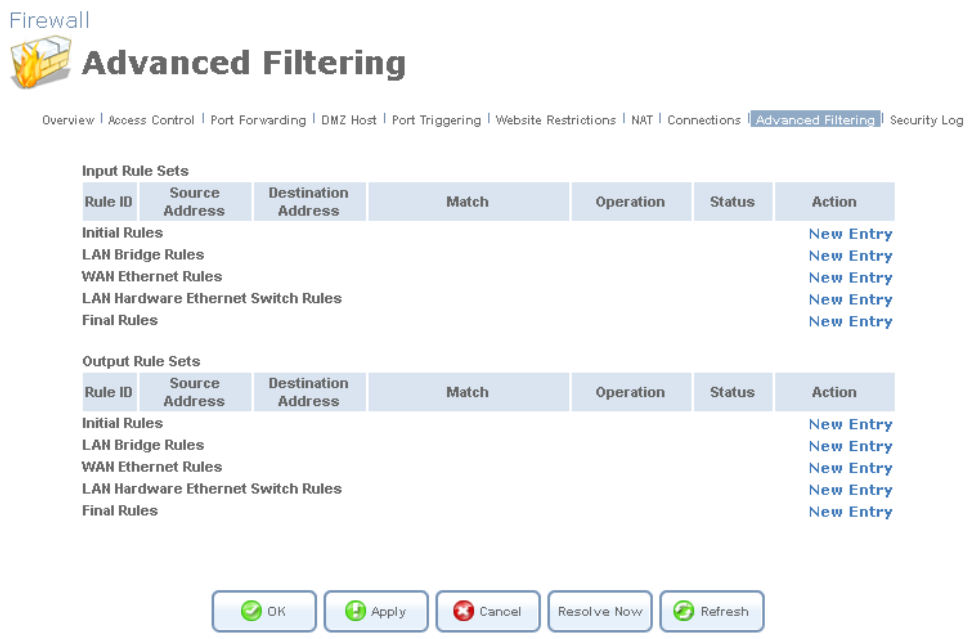


Figure 7.125. Advanced Filtering

This screen is divided into two identical sections, one for 'Input Rule Sets' and the other for 'Output Rule Sets', which are for configuring inbound and outbound traffic, respectively. Each section is comprised of subsets, which can be grouped into three main subjects:

- Initial rules - rules defined here will be applied first, on all gateway devices.
- Network devices rules - rules can be defined per each gateway device.
- Final rules - rules defined here will be applied last, on all gateway devices.

The order of the rules' appearance represents both the order in which they were defined and the sequence by which they will be applied. You may change this order after your rules are already defined (without having to delete and then re-add them), by using the action icon and action icon (see figure 'Move Up and Move Down Action Icons').

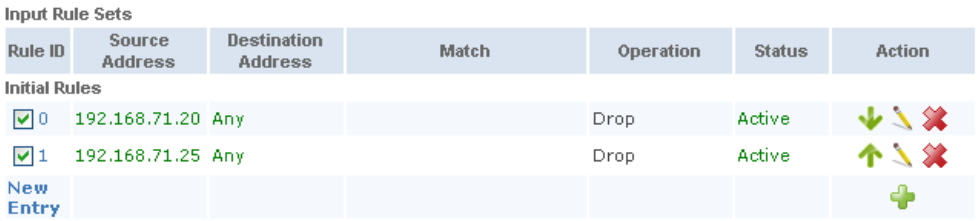


Figure 7.126. Move Up and Move Down Action Icons

There are numerous rules automatically inserted by the firewall in order to provide improved security and block harmful attacks. To add an advanced filtering rule, first choose the traffic direction and the device on which to set the rule. Then click the appropriate 'New Entry' link. The 'Add Advanced Filter' screen appears:

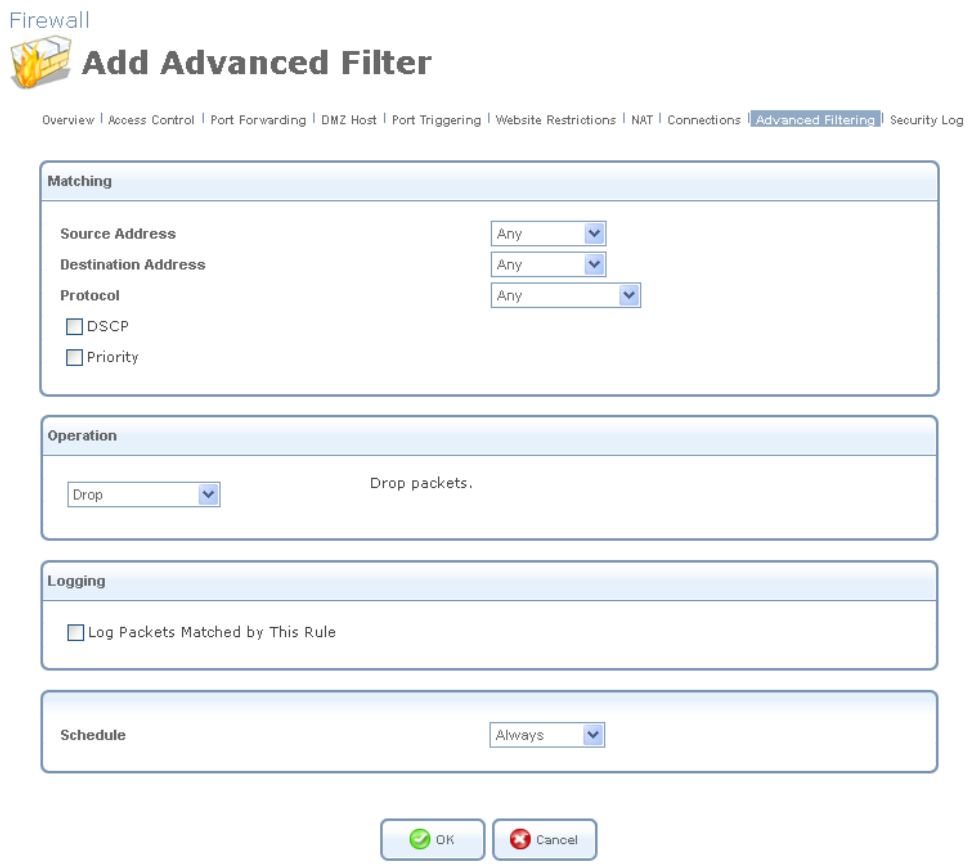


Figure 7.127. Add Advanced Filter

The 'Matching' and 'Operation' sections of this screen define the operation to be executed when matching conditions apply.

Matching Use this section to define the rule's conditions, which are the LAN computer's parameters to be matched.

Source Address The source address of packets sent or received from the network object. The combo-box displays all the host names or IP addresses of currently connected LAN computers, as well as the options 'Any' and 'User Defined'. Select an address from the list, or 'Any' to apply the rule on all computers. If you would like add a new address, select the 'User Defined' option in the combo-box. This will commence a sequence that will add a new *network object*, representing the LAN computer. Please refer to section Section 8.9.2 in order to learn how to do so.

Destination Address The destination address of packets sent or received from the network object. This address can be configured in the same manner as the source address. This entry enables further filtration of the packets.

Protocol You may also specify a traffic protocol. Selecting the 'Show All Services' option in the combo-box will expand the list of available protocols. Select a protocol or add a new one using the 'User Defined' option. This will commence a sequence that will add a new *service*, representing the protocol. Please refer to section Section 8.9.1 in order to learn how to do so.

Operation Define what action the rule will take, by selecting one of the following radio buttons:

Drop Deny access to packets that match the source and destination IP addresses and service ports defined above.

Reject Deny access to packets that match the criteria defined, and send an ICMP error or a TCP reset to the origination peer.

Accept Connection Allow access to packets that match the criteria defined. The data transfer session will be handled using Stateful Packet Inspection (SPI), meaning that other packets matching this rule will be automatically allowed access.

Accept Packet Allow access to packets that match the criteria defined. The data transfer session will not be handled using SPI, meaning that other packets matching this rule will not be automatically allowed access. This can be useful, for example, when creating rules that allow broadcasting.

Logging Monitor the rule:

Log Packets Matched by This Rule Check this check box to log the first packet from a connection that was matched by this rule.

Schedule By default, the rule will always be active. However, you can configure scheduler rules by selecting 'User Defined', in order to define time segments during which the rule may be active. To learn how to configure scheduler rules please refer to section Section 8.9.3.

7.3.10. Security Log

The 'Security Log' screen displays a list of firewall-related events, including attempts to establish inbound and outbound connections, attempts to authenticate through an administrative interface (WBM or Telnet terminal), firewall configuration and system start-up. To view the security log, click the 'Security Log' tab in the 'Security' management screen. The 'Security Log' screen appears.

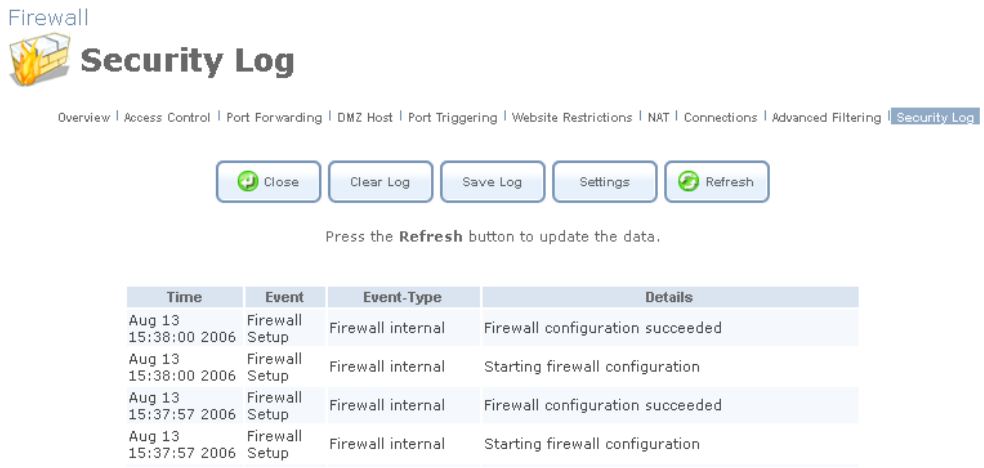


Figure 7.128. Security Log

Time The time the event occurred.

Event There are five kinds of events:

- Inbound Traffic: The event is a result of an incoming packet.
- Outbound Traffic: The event is a result of outgoing packet.
- Firewall Setup: Configuration message.
- WBM Login: Indicates that a user has logged in to WBM.
- CLI Login: Indicates that a user has logged in to CLI (via Telnet).

Event-Type A textual description of the event:

- Blocked: The packet was blocked. The message is colored red.

- Accepted: The packet was accepted. The message is colored green.

Details More details about the packet or the event, such as protocol, IP addresses, ports, etc.
To view or change the security log settings:

1. Click the 'Settings' button that appears at the top of the 'Firewall Log' screen. The 'Security Log Settings' screen appears.

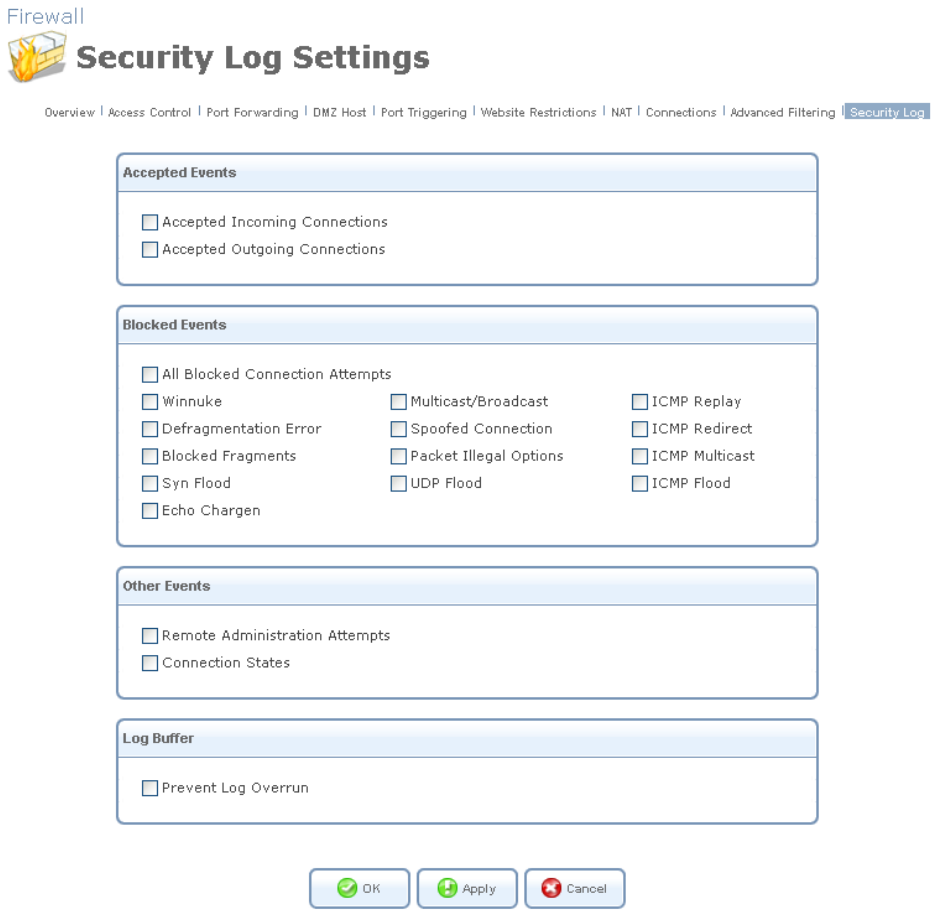


Figure 7.129. Security Log Settings

2. Select the types of activities for which you would like to have a log message generated:

   - Accepted Events
     Accepted Incoming Connections Write a log message for each successful attempt to establish an inbound connection to the home network.

     Accepted Outgoing Connections Write a log message for each successful attempt to establish an outgoing connection to the public network.

   - Blocked Events
     All Blocked Connection Attempts Write a log message for each blocked attempt to establish an inbound connection to the home network or vice versa. You can enable logging of blocked packets of specific types by disabling this option, and enabling some of the more specific options below it.

     Specific Events Specify the blocked events that should be monitored. Use this to monitor specific event such as SynFlood. A log message will be generated if either the corresponding check-box is checked, or the "All Blocked Connection Attempts" check-box is checked.

   - Other Events

Remote Administration Attempts Write a log message for each remote-administration connection attempt, whether successful or not.

Connection States Provide extra information about every change in a connection opened by the firewall. Use this option to track connection handling by the firewall and Application Level Gateways (ALGs).

- Log Buffer
  Prevent Log Overrun Select this check box in order to stop logging firewall activities when the memory allocated for the log fills up.

3. Click 'OK' to save the settings.

The following are the available event types that can be recorded in the firewall log:

1. Firewall internal - an accompanying explanation from the firewall internal mechanism will be added in case this event-type is recorded.
2. Firewall status changed - the firewall changed status from up to down or the other way around, as specified in the event type description.
3. STP packet - an STP packet has been accepted/rejected.
4. Illegal packet options - the options field in the packet's header is either illegal or forbidden.
5. Fragmented packet - a fragment has been rejected.
6. WinNuke protection - a WinNuke attack has been blocked.
7. ICMP replay - an ICMP replay message has been blocked.
8. ICMP redirect protection - an ICMP redirected message has been blocked.
9. Packet invalid in connection - a packet has been blocked, being on an invalid connection.
10. ICMP protection - a broadcast ICMP message has been blocked.
11. Broadcast/Multicast protection - a packet with a broadcast/multicast source IP has been blocked.
12. Spoofing protection - a packet from the WAN with a source IP of the LAN has been blocked.
13. DMZ network packet - a packet from a demilitarized zone network has been blocked.
14. Trusted device - a packet from a trusted device has been accepted.
15. Default policy - a packet has been accepted/blocked according to the default policy.
16. Remote administration - a packet designated for OpenRG management has been accepted/blocked.
17. Access control - a packet has been accepted/blocked according to an access control rule.
18. Parental control - a packet has been blocked according to a parental control rule.
19. NAT out failed - NAT failed for this packet.
20. DHCP request - OpenRG sent a DHCP request (depends on the distribution).
21. DHCP response - OpenRG received a DHCP response (depends on the distribution).
22. DHCP relay agent - a DHCP relay packet has been received (depends on the distribution).
23. IGMP packet - an IGMP packet has been accepted.

24. Multicast IGMP connection - a multicast packet has been accepted.
25. RIP packet - a RIP packet has been accepted.
26. PPTP connection - a packet inquiring whether OpenRG is ready to receive a PPTP connection has been accepted.
27. Kerberos key management 1293 - security related, for future use.
28. Kerberos 88 - for future use.
29. AUTH:113 request - an outbound packet for AUTH protocol has been accepted (for maximum security level).
30. Packet-Cable - for future use.
31. IPV6 over IPV4 - an IPv6 over IPv4 packet has been accepted.
32. ARP - an ARP packet has been accepted.
33. PPP Discover - a PPP discover packet has been accepted.
34. PPP Session - a PPP session packet has been accepted.
35. 802.1Q - a 802.1Q (VLAN) packet has been accepted.
36. Outbound Auth1X - an outbound Auth1X packet has been accepted.
37. IP Version 6 - an IPv6 packet has been accepted.
38. OpenRG initiated traffic - all traffic that OpenRG initiates is recorded.
39. Maximum security enabled service - a packet has been accepted because it belongs to a permitted service in the maximum security level.
40. SynCookies Protection - a SynCookies packet has been blocked.
41. ICMP Flood Protection - a packet has been blocked, stopping an ICMP flood.
42. UDP Flood Protection - a packet has been blocked, stopping a UDP flood.
43. Service - a packet has been accepted because of a certain service, as specified in the event type.
44. Advanced Filter Rule - a packet has been accepted/blocked because of an advanced filter rule.
45. Fragmented packet, header too small - a packet has been blocked because after the defragmentation, the header was too small.
46. Fragmented packet, header too big - a packet has been blocked because after the defragmentation, the header was too big.
47. Fragmented packet, drop all - not used.
48. Fragmented packet, bad align - a packet has been blocked because after the defragmentation, the packet was badly aligned.
49. Fragmented packet, packet too big - a packet has been blocked because after the defragmentation, the packet was too big.
50. Fragmented packet, packet exceeds - a packet has been blocked because defragmentation found more fragments than allowed.

51. Fragmented packet, no memory - a fragmented packet has been blocked because there was no memory for fragments.

52. Fragmented packet, overlapped - a packet has been blocked because after the defragmentation, there were overlapping fragments.

53. Defragmentation failed - the fragment has been stored in memory and blocked until all fragments arrived and defragmentation could be performed.

54. Connection opened - usually a debug message regarding a connection.

55. Wildcard connection opened - usually a debug message regarding a connection.

56. Wildcard connection hooked - usually debug message regarding connection.

57. Connection closed - usually a debug message regarding a connection.

58. Echo/Chargen/Quote/Snork protection - a packet has been blocked, protecting from Echo/Chargen/Quote/Snork.

59. First packet in connection is not a SYN packet - a packet has been blocked because of a TCP connection that had started without a SYN packet.

60. Error: No memory - a message notifying that a new connection has not been established because of lack of memory.

61. NAT Error : Connection pool is full - a message notifying that a connection has not been created because the connection pool is full.

62. NAT Error: No free NAT IP - a message notifying that there is no free NAT IP, therefore NAT has failed.

63. NAT Error: Conflict Mapping already exists - a message notifying that there is a conflict since the NAT mapping already exists, therefore NAT has failed.

64. Malformed packet: Failed parsing - a packet has been blocked because it is malformed.

65. Passive attack on ftp-server: Client attempted to open Server ports - a packet has been blocked because of an unauthorized attempt to open a server port.

66. FTP port request to 3rd party is forbidden (Possible bounce attack) - a packet has been blocked because of an unauthorized FTP port request.

67. Firewall Rules were changed - the firewall rule set has been modified.

68. User authentication - a message during login time, including both successful and failed authentication.

69. First packet is Invalid - First packet in connection failed to pass firewall or NAT

7.3.11. Applying Corporate-Grade Security

The following set of instructions is designed to assist you in applying corporate-grade security standards to your network. When implementing these instructions, it is important to execute the configuration steps in the exact order they are presented. To apply corporate-grade firewall security standards perform the following:

- Do not allow non-administrative services access to the LAN:

    1. Open a Telnet session from a LAN host that is connected to OpenRG.

    2. Telnet to OpenRG at address 192.168.1.1.

3. Logon to OpenRG as an administrator (the default username and password are both 'admin').
4. After logging on, issue the following command at the prompt:

```
OpenRG> conf set fw/protect/allow_rg_remote_administration_only 1
OpenRG> conf reconf 1
OpenRG> exit
```

- Configure OpenRG to permit only HTTPS as means of remote administration:
  1. Click the 'Management' tab under 'System'.
  2. Click the 'Remote Administration' tab.
  3. Enable the following check boxes:
     - Using Primary HTTPS Port (443)
     - Using Secondary HTTPS Port (8443)

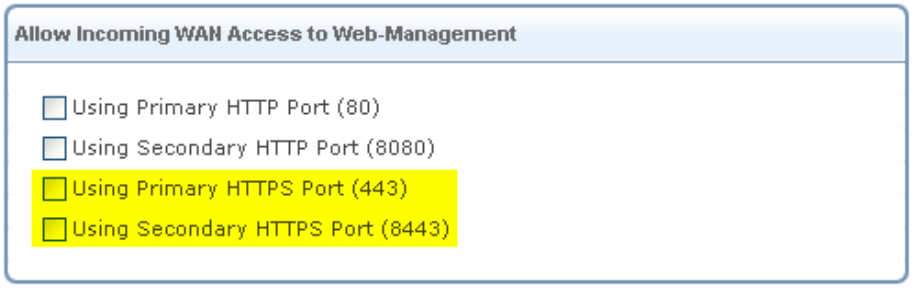

Allow Incoming WAN Access to Web-Management
Using Primary HTTP Port (80)
Using Secondary HTTP Port (8080)
Using Primary HTTPS Port (443)
Using Secondary HTTPS Port (8443)

Figure 7.130. Enabling Secure Remote Administration

  4. Click 'OK' to save the settings.

- Apply firewall protection on the LAN:
  1. Click the 'Network Connections' tab under 'System'.
  2. Click the 'LAN Ethernet' connection link.
  3. Click the 'Advanced' button.
  4. Enable the 'Internet Connection Firewall' check box.

Figure 7.131. Apply Firewall Protection

  5. Click 'OK' to save the settings.

At this point you have set your firewall to corporate-grade security. If you wish to allow additional LAN services, or other outbound services, refer to the 'Advanced Filtering' section Section 7.3.9 .

7.3.11.1. Secure Local Administration

You can connect directly to OpenRG in order to perform local administration tasks. To do so it is necessary to establish a PPP over Serial (PPPoS) connection between the administration host and OpenRG. To perform local administration via a PPPoS connection perform the following:

1. Connect a serial cable between the administration host and the gateway.
2. Run a PPP client on the administration host (depicted in the following sections).
3. After the PPP connection is established, OpenRG can be accessed via HTTP/HTTPS over this connection.
4. Reset the gateway when you are done.

To perform local administration you need a computer with:

- A serial connection
- Windows 2000/XP or Linux operating system

7.3.11.1.1. Running a PPP Client on Linux

To run a PPP client on a Linux host, perform the following:

```
pppd <SERIAL_DEV_NAME> <BAUD> noauth user <USERNAME> local nobsdcomp nodeflate
```

Where

SERIAL_DEV_NAME is the name of the serial device on the Linux machine, e.g. /dev/ttyS1.

BAUD is the required baud rate

USERNAME is the name of a user in OpenRG with Administrator Privileges. Make sure that a proper secret is defined in either /etc/ppp/chap-secrets or /etc/ppp/pap-secrets on the Linux machine.

7.3.11.1.2. Running a PPP Client on Windows XP

To run a PPP client on Windows XP, perform the following:

1. Install a NULL Modem Driver:
    1. Click the 'Phone and Modem Options' icon on the Control Panel.
    2. Select the Modems tab, and press the 'Add' button.
    3. Mark the 'Don't detect my modem; I will select it from a list' check-box, and Press Next.

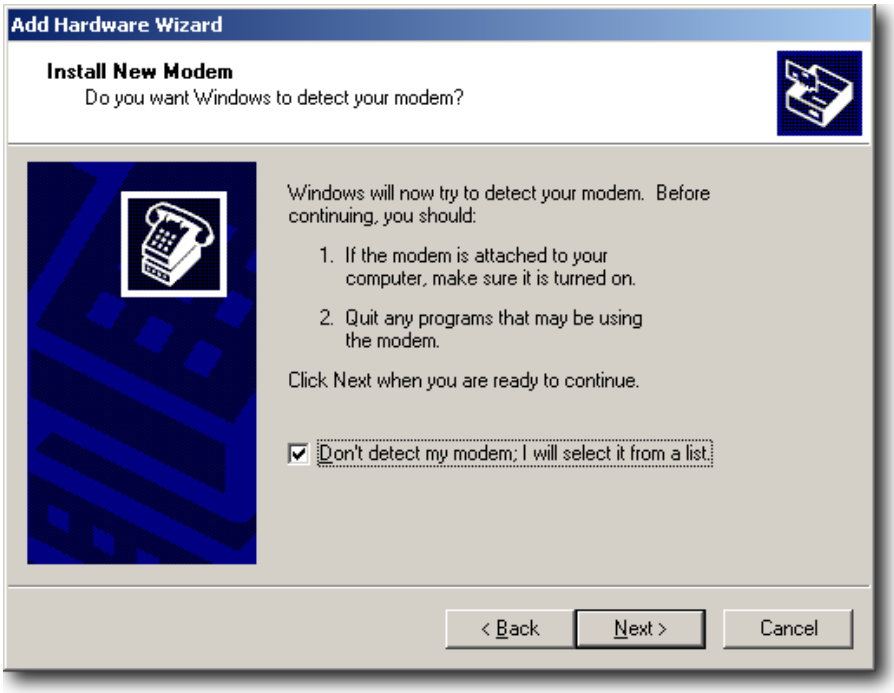

Add Hardware Wizard
Install New Modem
Do you want Windows to detect your modem?
Windows will now try to detect your modem. Before continuing, you should:
1. If the modem is attached to your computer, make sure it is turned on.
2. Quit any programs that may be using the modem.
Click Next when you are ready to continue.
Don't detect my modem; I will select it from a list.
< Back
Next >
Cancel

Figure 7.132. Installing the NULL Modem Driver

4. From 'Standard Modem Types' select 'Communications cable between two computers', and press the 'Next' button.

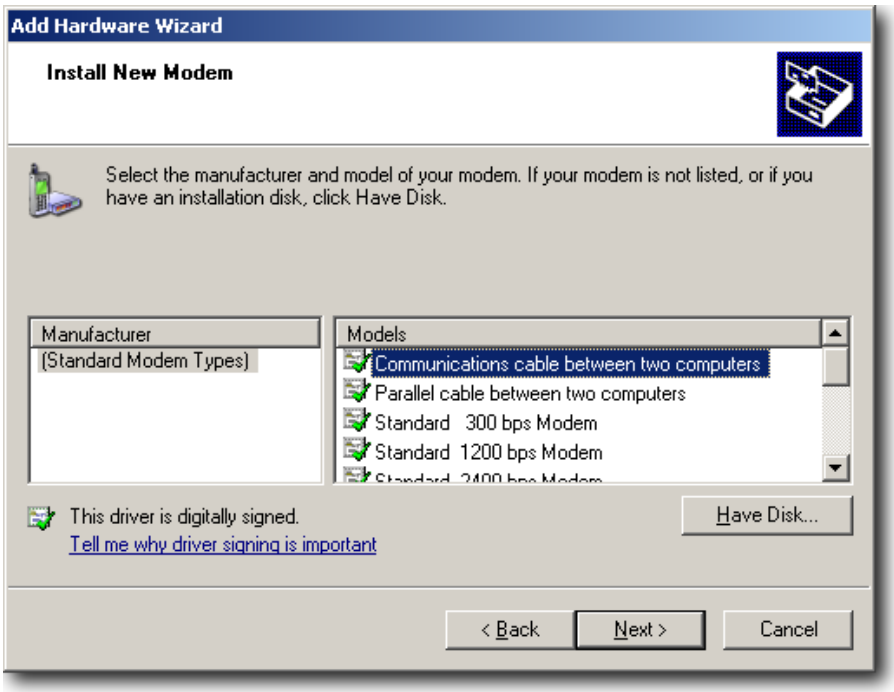

Add Hardware Wizard
Install New Modem
Select the manufacturer and model of your modem. If your modem is not listed, or if you have an installation disk, click Have Disk.
Manufacturer
(Standard Modem Types)
Models
Communications cable between two computers
Parallel cable between two computers
Standard 300 bps Modem
Standard 1200 bps Modem
This driver is digitally signed.
Tell me why driver signing is important
Have Disk...
< Back
Next >
Cancel

Figure 7.133. Select Modem Type

5. Select 'All ports', and press the 'Next' button.

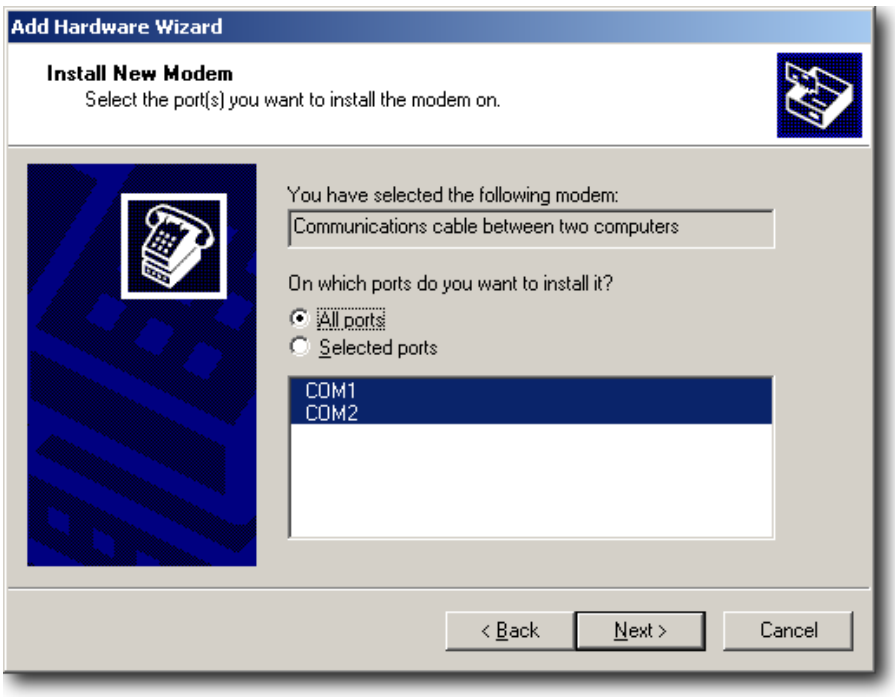


Figure 7.134. Select Ports

2. Create a new direct connection:
    1. Click the 'Network Connections' icon from 'Network and Internet Connections' on the Control Panel.
    2. Select 'Create a new connection' button, and press the 'Next' button.
    3. Select 'Set up an advanced connection' and press the 'Next' button.
    4. Select 'Connect directly to another computer' and press the 'Next' button.
    5. Select 'Guest' and press the 'Next' button.
    6. Enter a name for the connection and press the 'Next' button.
    7. Select the serial device that is connected to OpenRG from the drop down list, and press the 'Next' button.
    8. Press the 'Finish' button.
3. Edit the created connection:
    1. Right click the newly created connection and select 'Properties'.
    2. From the 'Networking' tab, select PPP from the drop down list.
    3. Press the 'Settings' button, and clear all of the check-boxes.
    4. Press the 'OK' button.
    5. Press the 'General' tab, and select the COM port you are using from the drop down list.
    6. Press the 'Configure' button.
    7. In the 'Modem Configuration' screen, select 115200 as the Maximum speed from the drop down list.

8. Make sure all of the check box options are not selected.
9. Press the 'OK' button.
10. Press the 'OK' button.

4. Connect to OpenRG:
    1. Double click the newly created connection.
    2. Enter a name of a user with Administrator privileges.
    3. Enter the password for the user.
    4. Press Connect.

7.3.11.1.3. Running a PPP Client on Windows 2000

To run a PPP client on Windows 2000, perform the following:

1. Install a NULL Modem Driver:
    1. Click the 'Phone and Modem Options' icon on the Control Panel.
    2. Select the Modems tab, and press the 'Add' button.
    3. Mark the 'Don't detect my modem; I will select it from a list' check-box, and Press Next.

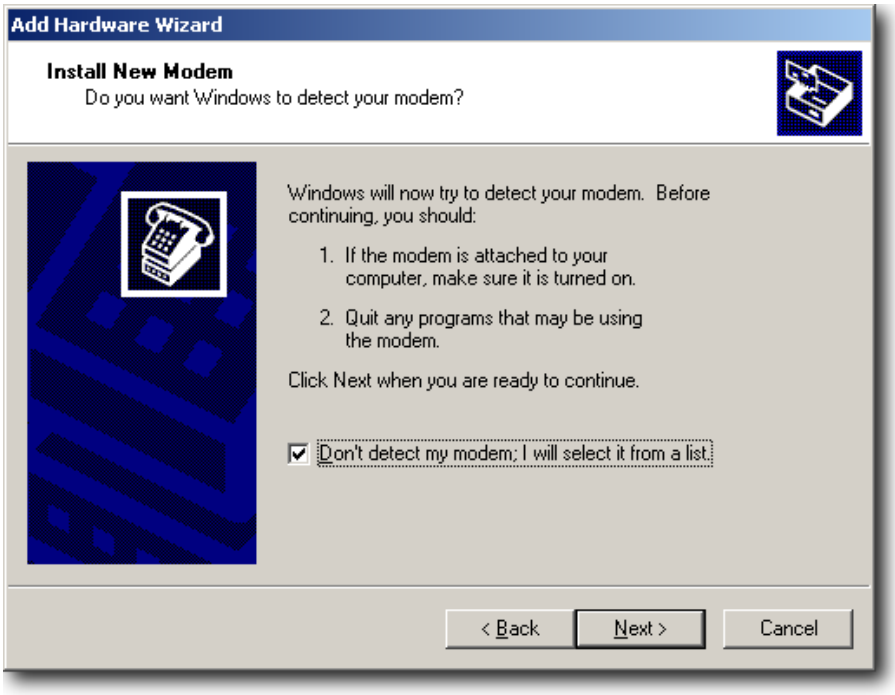

Add Hardware Wizard
Install New Modem
Do you want Windows to detect your modem?
Windows will now try to detect your modem. Before continuing, you should:
1. If the modem is attached to your computer, make sure it is turned on.
2. Quit any programs that may be using the modem.
Click Next when you are ready to continue.
Don't detect my modem; I will select it from a list.
< Back
Next >
Cancel

Figure 7.135. Installing a Modem Driver

4. From 'Standard Modem Types' select 'Communications cable between two computers', and press the 'Next' button.

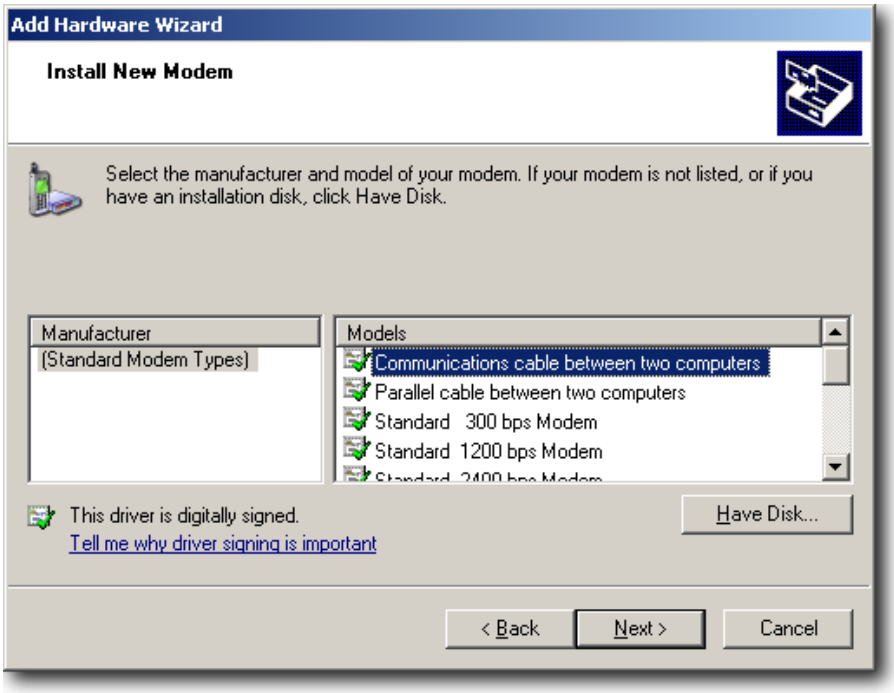

Add Hardware Wizard
Install New Modem
Select the manufacturer and model of your modem. If your modem is not listed, or if you have an installation disk, click Have Disk.
Manufacturer
(Standard Modem Types)
Models
Communications cable between two computers
Parallel cable between two computers
Standard 300 bps Modem
Standard 1200 bps Modem
This driver is digitally signed.
Tell me why driver signing is important
Have Disk...
< Back
Next >
Cancel

Figure 7.136. Select Modem Type

5. Select 'All ports', and press the 'Next' button.

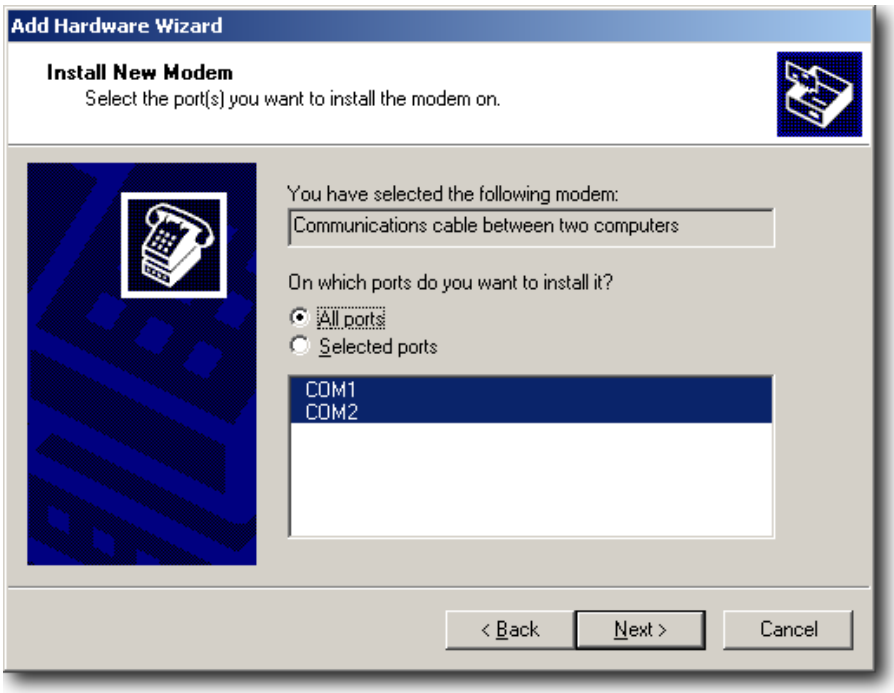


Figure 7.137. Select Ports

2. Create a new direct connection:

    1. Click the 'Network Connections' icon from 'Network and Internet Connections' on the Control Panel.

    2. Select 'Create a new connection' button, and press the 'Next' button.

3. Select 'Connect directly to another computer' and press the 'Next' button.
4. Select 'Guest' and press the 'Next' button.
5. Select the serial device that is connected to OpenRG from the drop down list, and press the 'Next' button.
6. Select the 'Only for myself' radio button and press the 'Next' button.
7. Enter a name for the connection and press the 'Finish' button.

3. Edit the created connection:
    1. Right click the newly created connection and select 'Properties'.
    2. From the 'Networking' tab, select PPP from the drop down list.
    3. Press the 'Settings' button, and clear all of the check-boxes.
    4. Press the 'OK' button.
    5. Press the 'General' tab, and select the COM port you are using from the drop down list.
    6. Press the 'Configure' button.
    7. In the 'Modem Configuration' screen, select 115200 as the Maximum speed from the drop down list.
    8. Make sure all of the check box options are not selected.
    9. Press the 'OK' button.
    10. Press the 'OK' button.
4. Connect to OpenRG:
    1. Double click the newly created connection.
    2. Enter a name of a user with Administrator privileges.
    3. Enter the password for the user.
    4. Press Connect.

7.4. Quality of Service

Network-based applications and traffic are growing at a high rate, producing an ever-increasing demand for bandwidth and network capacity. For obvious reasons, bandwidth and capacity cannot be expanded infinitely, requiring that bandwidth-demanding services be delivered over existing infrastructure, without incurring additional, expansive investments. The next logical means of ensuring optimal use of existing resources are Quality of Service (QoS) mechanisms for congestion management and avoidance. Quality of Service refers to the capability of a network device to provide better service to selected network traffic. This is achieved by shaping the traffic and processing higher priority traffic before lower priority traffic. As Quality of Service is dependent on the "weakest link in the chain", failure of but a single component along the data path to assure priority packet transmission can easily cause a VoIP call or a Video on Demand (VoD) broadcast to fail miserably. QoS must therefore obviously be addressed end-to-end.

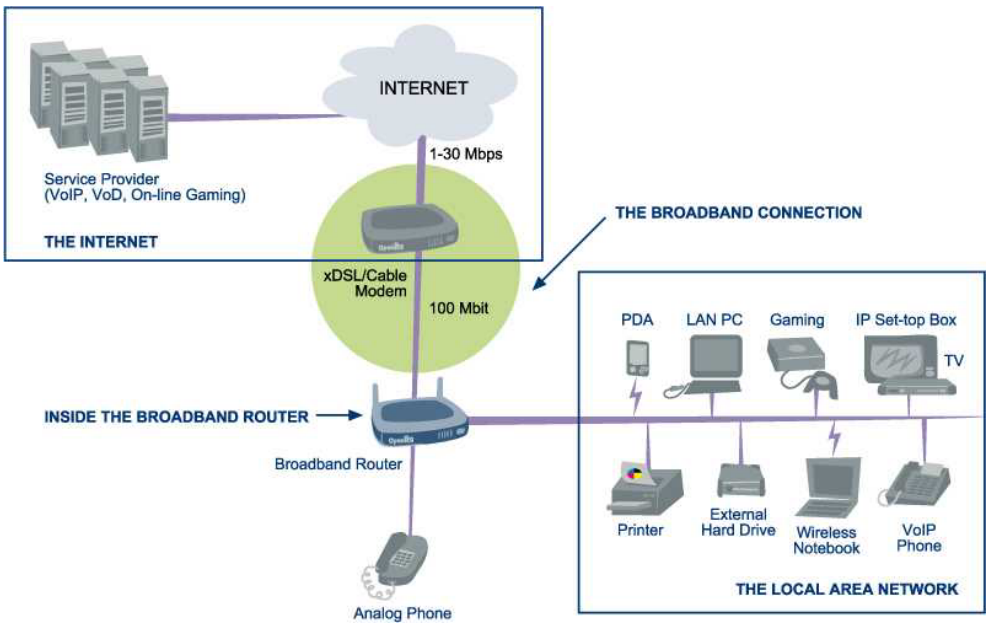


Figure 7.138. End-to-end QoS Challenge Areas

The following are the potential bottleneck areas that need be taken into consideration when implementing an end-to-end QoS-enabled service.

- **The Local Area Network** LANs have finite bandwidth, and are typically limited to 100 Mbps. When given the chance, some applications will consume all available network bandwidth. In business networks, a large number of network-attached devices can lead to congestion. The need for QoS mechanisms is more apparent in wireless LANs (802.11a/b/g), where bandwidth is even more limited (typically no more than 20 Mbps on 802.11g networks).

- **The Broadband Router** All network traffic passes through and is processed by the broadband router. It is therefore a natural focal point for QoS implementation. Lack of sufficient buffer space, memory or processing power, and poor integration among system components can result in highly undesirable real-time service performance. The only way to assure high quality of service is the use of proper and tightly-integrated router operating system software and applications, which can most effectively handle multiple real-time services simultaneously.

- **The Broadband Connection** Typically the most significant bottleneck of the network, this is where the high speed LAN meets limited broadband bandwidth. Special QoS mechanisms must be built into routers to ensure that this sudden drop in connectivity speed is taken into account when prioritizing and transmitting real-time service-related data packets.

- **The Internet** Internet routers typically have a limited amount of memory and bandwidth available to them, so that congestions may easily occur when links are over-utilized, and routers attempt to queue packets and schedule them for retransmission. One must also consider the fact that while Internet backbone routers take some prioritization into account when making routing decisions, all data packets are treated equally under congested conditions.

The follwing figure depicts OpenRG's QoS role and architecture in a network. Many of the terms it contains will become familiar as you read on.

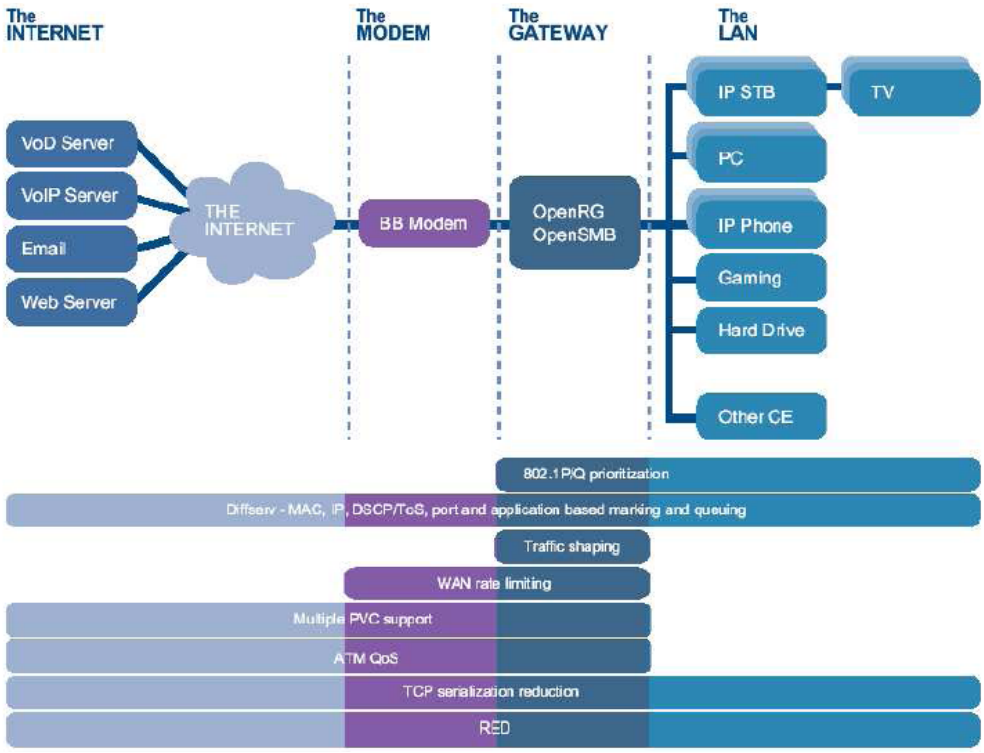


Figure 7.139. OpenRG's QoS Architecture

7.4.1. Overview

The 'General' tab provides a Quality of Service "wizard", with which you can configure your QoS parameters according to predefined profiles, with just a few clicks. A chosen QoS profile will automatically define QoS rules, which you can view and edit in the rest of the QoS tab screens, described later in this chapter.

Note: Selecting a QoS profile will cause all previous QoS configuration settings to be **permanently lost** .

Click the QoS tab under 'Services'. The 'Quality of Service' screen appears, displaying the 'Overview' tab (see figure Figure 7.140).

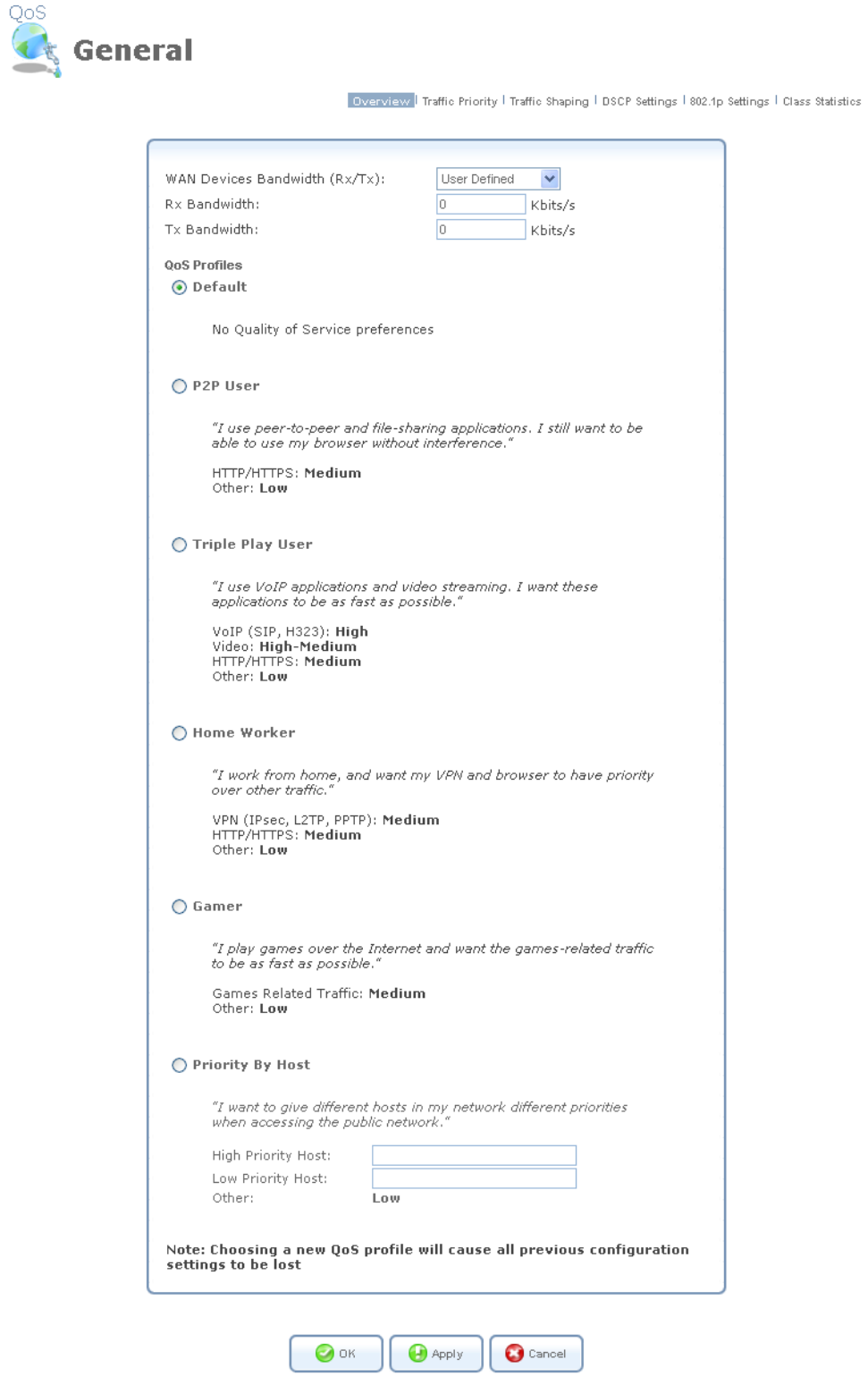

QoS
General
Overview | Traffic Priority | Traffic Shaping | DSCP Settings | 802.1p Settings | Class Statistics
WAN Devices Bandwidth (Rx/Tx):
User Defined
Rx Bandwidth:
0
Kbits/s
Tx Bandwidth:
0
Kbits/s
QoS Profiles
Default
No Quality of Service preferences
P2P User
"I use peer-to-peer and file-sharing applications. I still want to be able to use my browser without interference."
HTTP/HTTPS: Medium
Other: Low
Triple Play User
"I use VoIP applications and video streaming. I want these applications to be as fast as possible."
VoIP (SIP, H323): High
Video: High-Medium
HTTP/HTTPS: Medium
Other: Low
Home Worker
"I work from home, and want my VPN and browser to have priority over other traffic."
VPN (IPsec, L2TP, PPTP): Medium
HTTP/HTTPS: Medium
Other: Low
Gamer
"I play games over the Internet and want the games-related traffic to be as fast as possible."
Games Related Traffic: Medium
Other: Low
Priority By Host
"I want to give different hosts in my network different priorities when accessing the public network."
High Priority Host:
Low Priority Host:
Other:
Low
Note: Choosing a new QoS profile will cause all previous configuration settings to be lost
OK
Apply
Cancel

Figure 7.140. General

WAN Devices Bandwidth (Rx/Tx) Before selecting the QoS profile that mostly suits your needs, select your bandwidth from this combo-box. If you do not see an appropriate entry, select 'User Defined', and enter your Tx and Rx bandwidths manually.

Tx Bandwidth Enter your Tx bandwidth in Kbits per second.

Rx Bandwidth Enter your Rx bandwidth in Kbits per second.

Note: Entering inaccurate Tx/Rx values will cause incorrect behavior of the QoS module. It is important to set these fields as accurately as possible.

QoS Profiles Select the profile that mostly suits your bandwidth usage. Each profile entry displays a quote describing what the profile is best used for, and the QoS priority levels granted to each bandwidth consumer in this profile.

- Default -- No QoS profile, however the device is limited by the requested bandwidth, if specified
- P2P User -- Peer-to-peer and file sharing applications will receive priority
- Triple Play User -- VoIP and video streaming will receive priority
- Home Worker -- VPN and browsing will receive priority
- Gamer -- Game-related traffic will receive priority
- Priority By Host -- This entry provides the option to configure which computer in your LAN will receive the highest priority and which the lowest. If you have additional computers, they will receive medium priority.
  High Priority Host Enter the host name or IP address of the computer to which you would like to grant the highest bandwidth priority.

  Low Priority Host Enter the host name or IP address of the computer to which you would like to grant the lowest bandwidth priority.

7.4.2. Internet Connection Utilization

The 'Internet Connection Utilization' screen provides application level usage information of your Internet connection's bandwidth. You can view what application on which LAN computer is using how much bandwidth, at any given time. This information is provided in both application and computer views.

7.4.2.1. Application View

By default, the information is presented in "By Application" view. The screen refreshes constantly. You can stop its refreshing by using the 'Auto Refresh Off' button at the bottom of the screen.

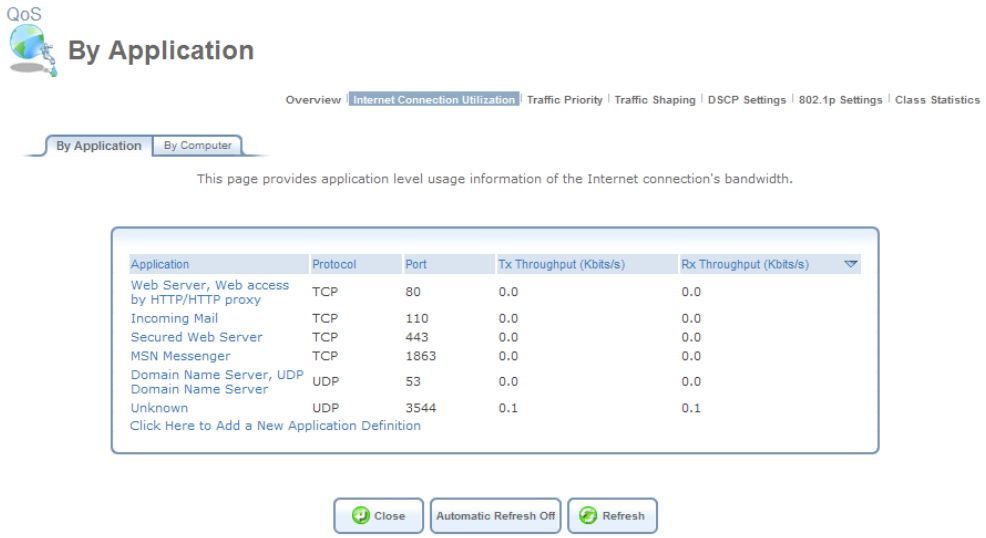


Figure 7.141. Internet Connection Utilization by Application

The table displays the following information fields. Note that you can sort the table according to these fields (ascending or descending), by clicking the fields' names.

Application The type of application using the bandwidth.

Protocol The application's network protocol.

Port The port through which traffic is transferred.

Tx Throughput The transmission bit rate in kilo-bits per second.

Rx Throughput The reception bit rate in kilo-bits per second.
OpenRG does not recognize all possible applications running on LAN computers, and marks such an application as "Unknown" (see figure Figure 7.141). You can define an unknown application by clicking the 'Click Here to Add a New Application Definition' link at the bottom of the table. The 'Protocols' screen appears, in which you can define the application by adding it as a new service entry. To learn more about adding protocols, refer to section Section 8.9.1. Furthermore, you can click each application's name to view its details, particularly which LAN computer is running it.

Figure 7.142. A Specific Application

In this example, the application "Incoming Mail" is running on computer 192.168.1.2, using TCP protocol on port 110. This screen provides a combined application and computer view, and enables you to select the general traffic priorities for that computer.

7.4.2.2. Computer View

The "By Computer" tab presents a table displaying the sum of bandwidth used by each LAN computer. The fields displayed are the computer's IP address and the Tx and Rx throughput.

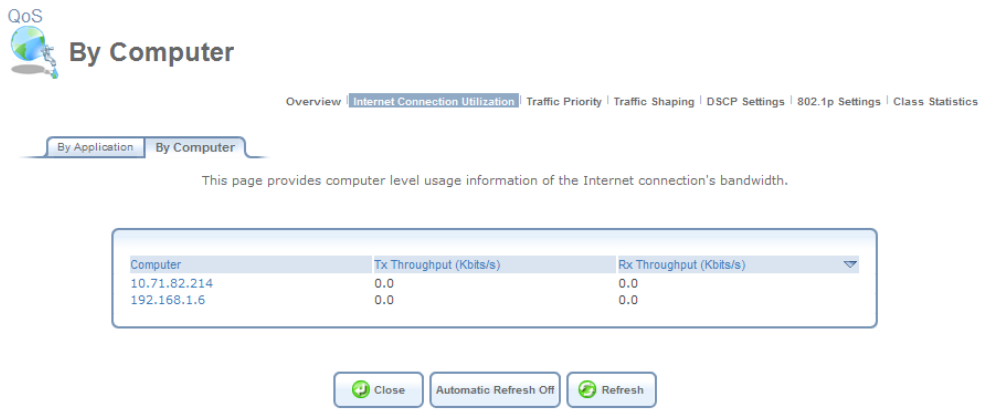


Figure 7.143. Internet Connection Utilization by Computer

Click a computer's IP address to view the bandwidth-consuming applications running on that computer.

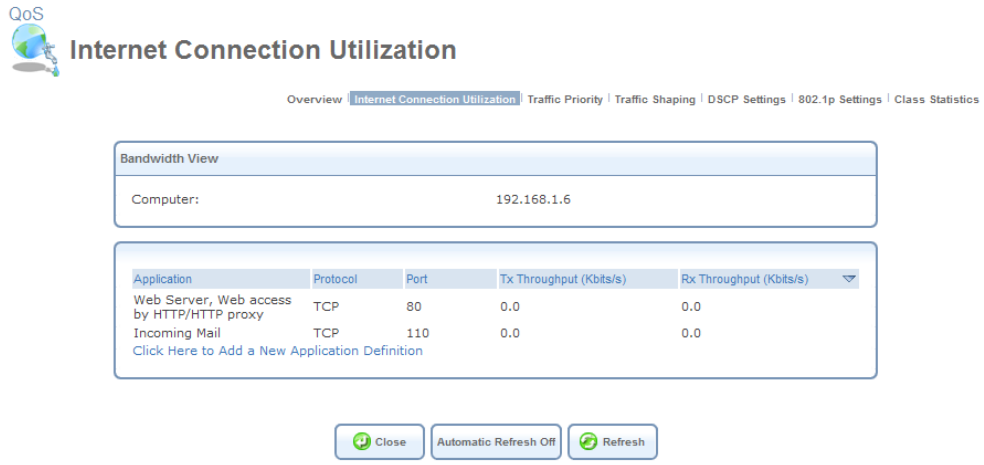

QoS
Internet Connection Utilization
Overview | Internet Connection Utilization | Traffic Priority | Traffic Shaping | DSCP Settings | 802.1p Settings | Class Statistics
Bandwidth View
Computer: 192.168.1.6
Application | Protocol | Port | Tx Throughput (Kbits/s) | Rx Throughput (Kbits/s)
Web Server, Web access by HTTP/HTTP proxy | TCP | 80 | 0.0 | 0.0
Incoming Mail | TCP | 110 | 0.0 | 0.0
Click Here to Add a New Application Definition
Close
Automatic Refresh Off
Refresh

Figure 7.144. A Specific Computer

In this example, computer 192.168.1.6 is running the applications "Web Server" and "Incoming Mail". This screen provides a combined computer and application view, by displaying a computer-specific application table. This table also enables you to define an unknown application (as described in the previous section).

7.4.3. Traffic Priority

Traffic Priority allows you to manage and avoid traffic congestion by defining inbound and outbound priority rules for each device on your gateway. These rules determine the priority that packets, traveling through the device, will receive. QoS parameters (DSCP marking and packet priority) are set per packet, on an application basis. You can set QoS parameters using flexible rules, according to the following parameters:

- Source/destination IP address, MAC address or host name
- Device
- Source/destination ports
- Limit the rule for specific days and hours

OpenRG supports two priority marking methods for packet prioritization:

- DSCP (see section Section 7.4.5).
- 802.1p Priority (see section Section 7.4.6).

The matching of packets by rules is connection-based, known as Stateful Packet Inspection (SPI), using the same connection-tracking mechanism used by Jfirewall. Once a packet matches a rule, all subsequent packets with the same attributes receive the same QoS parameters, both inbound and outbound. A packet can match more than one rule. Therefore:

- The first class rule has precedence over all other class rules (scanning is stopped once the first rule is reached).
- The first traffic-priority (classless) rule has precedence over all other traffic-priority rules.
- There is no prevention of a traffic-priority rule conflicting with a class rule. In this case, the priority and DSCP setting of the class rule (if given) will take precedence.

Connection-based QoS also allows inheriting QoS parameters by some of the applications that open subsequent connections. For instance, you can define QoS rules on SIP, and the rules will apply to both control and data ports (even if the data ports are unknown). This feature applies to all applications that have ALG at Jfirewall:

- SIP
- MSN Messenger/Windows Messenger
- TFTP
- FTP
- MGCP
- H.323
- Port Triggering applications (see section Section 7.3.5)
- PPTP
- IPSec

To set traffic priority rules:

1. Click 'Traffic Priority' under the 'QoS' tab in the 'Services' screen. The 'Traffic Priority' screen appears (see figure Figure 7.145). This screen is divided into two identical sections, one for 'QoS input rules' and the other for 'QoS output rules', which are for prioritizing inbound and outbound traffic, respectively. Each section lists all the gateway devices on which rules can be set. You can set rules on all devices at once, using the 'All devices' entry.

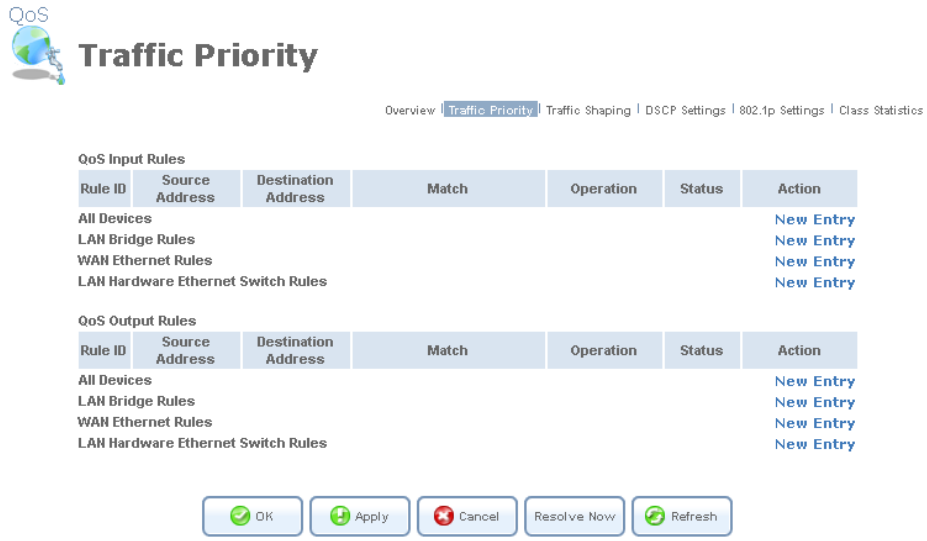


Figure 7.145. Traffic Priority

2. After choosing the traffic direction and the device on which to set the rule, click the appropriate New Entry link.
   The 'Add Traffic Priority Rule' screen appears.

Figure 7.146. Add Traffic Priority Rule

This screen is divided into two main sections, 'Matching' and 'Operation', which are for defining the operation to be executed when matching conditions apply.

Matching Use this section to define the rule's conditions, which are the LAN computer's parameters to be matched.

Source Address The source address of packets sent or received from the network object. The combo-box displays all the host names or IP addresses of currently connected LAN computers, as well as the options 'Any' and 'User Defined'. Select an address from the list, or 'Any' to apply the rule on all computers. If you would like add a new address, select the 'User Defined' option in the combo-box. This will commence a sequence that will add a new *network object*, representing the LAN computer. Please refer to section Section 8.9.2 in order to learn how to do so.

Destination Address The destination address of packets sent or received from the network object. This address can be configured in the same manner as the source address. This entry enables further filtration of the packets.

Protocol You may also specify a traffic protocol. Selecting the 'Show All Services' option in the combo-box will expand the list of available protocols. Select a protocol or add a new one using the 'User Defined' option. This will commence a sequence that will add a new *service*, representing the protocol. Please refer to section Section 8.9.1 in order to learn how to do so.

Operation Set rule priority with Quality of Service:

Set DSCP Check this check-box to mark a DSCP value on packets matching this rule. The screen will refresh (see figure Figure 7.147), allowing you to enter the hexadecimal value of the DSCP.

Figure 7.147. Set DSCP Rule

Set Priority Select this check box to add a priority to the rule. The screen refreshes (see figure Figure 7.148), allowing you to select from eight priority levels, zero being the lowest and seven the highest. This sets the priority of a packet on the connection matching the rule, while routing the packet. Each priority level is assigned a default queue number, where Queue 0 has the lowest priority. OpenRG's QoS supports up to eight queues.

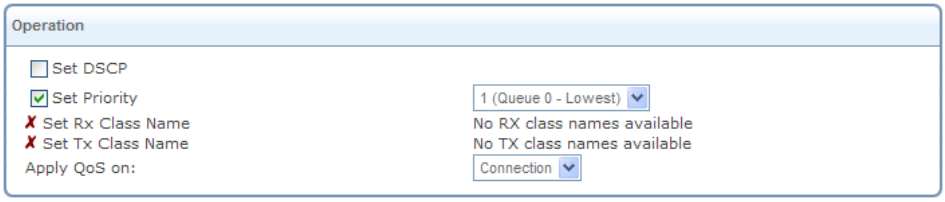


Figure 7.148. Set Priority with Queueing

The matching between a priority level and a queue number can be edited in the '802.1p Settings' screen (for more information, refer to section Section 7.4.6).

Apply QoS on Select whether to apply QoS on a connection or just the first packet. When applying on a connection, the data transfer session will be handled using Stateful Packet Inspection (SPI), meaning that other packets matching this rule will be automatically allowed access.

Logging Monitor the rule:

Log Packets Matched by This Rule Check this check box to log the first packet from a connection that was matched by this rule.

Schedule By default, the rule will always be active. However, you can configure scheduler rules by selecting 'User Defined', in order to define time segments during which the rule may be active. To learn how to configure scheduler rules please refer to section Section 8.9.3.

3. Click 'OK' to save the settings.

The order of the rules' appearance represents both the order in which they were defined and the sequence by which they will be applied. You may change this order after your rules are already defined (without having to delete and then re-add them), by using the action icon and action icon (see figure 'Move Up and Move Down Action Icons').

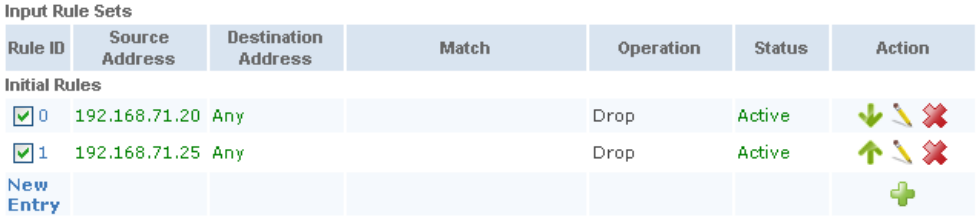


Figure 7.149. Move Up and Move Down Action Icons

7.4.4. Traffic Shaping

Traffic Shaping is the solution for managing and avoiding congestion where a high speed LAN meets limited broadband bandwidth. A user may have, for example, a 100 Mbps Ethernet LAN with a 100 Mbps WAN interface

router. The router may communicate with the ISP using a modem with a bandwidth of 2Mbps. This typical configuration makes the modem, having no QoS module, the bottleneck. The router sends traffic as fast as it is received, while its well-designed QoS algorithms are left unused. Traffic shaping limits the bandwidth of the router, artificially forcing the router to be the bottleneck. A traffic shaper is essentially a regulated queue that accepts uneven and/or bursty flows of packets and transmits them in a steady, predictable stream so that the network is not overwhelmed with traffic. While Traffic Priority allows basic prioritization of packets, Traffic Shaping provides more sophisticated definitions. Such are:

- Bandwidth limit for each device
- Bandwidth limit for classes of rules
- Prioritization policy
- TCP serialization on a device

Additionally, you can define QoS traffic shaping rules for a default device. These rules will be used on a device that has no definitions of its own. This enables the definition of QoS rules on Default WAN, for example, and their maintenance even if the PPP or bridge device over the WAN is removed.

7.4.4.1. Traffic Classes

The bandwidth of a device can be divided in order to reserve constant portions of bandwidth to predefined traffic types. Such a portion is known as a Traffic Class. When not used by its predefined traffic type, or owner (for example VoIP), the bandwidth will be available to all other traffic. However when needed, the entire class is reserved solely for its owner. Moreover, you can limit the maximum bandwidth that a class can use even if the entire bandwidth is available. When a shaping class is first defined for a specific traffic type, two shaping classes are created. The second class is the 'Default Class', which is responsible for all the packets that *do not* match the defined shaping class, or any other classes that may be defined on the device. You can also define **wildcard** devices, such as all WAN devices. This can be viewed in the Class Statistics screen (see figure Figure 7.163).

7.4.4.2. Device Traffic Shaping

This section describes the different Traffic Shaping screens and terms, and presents the feature's configuration logic.

1. Click 'Traffic Shaping' under the QoS tab in the 'Services' screen. The 'Traffic Shaping' screen appears.

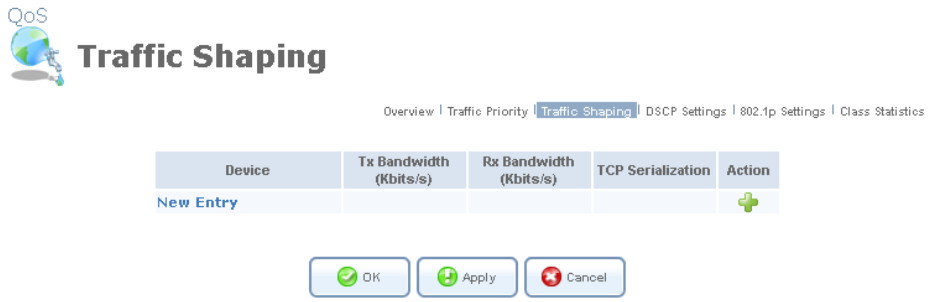


Figure 7.150. Traffic Shaping

You can select a specific device for which to shape the traffic, or you can select 'Any Device' to add a traffic shaping class to all devices.

2. Click the 'New Entry' link. The 'Add Device Traffic Shaping' screen appears (see figure Figure 7.151).
3. Select the device for which you would like to shape the traffic. The combo box includes all your gateway's devices as well as the option to select all devices in each category (e.g. All LAN Devices, All WAN Devices). In this example, select the WAN Ethernet option.

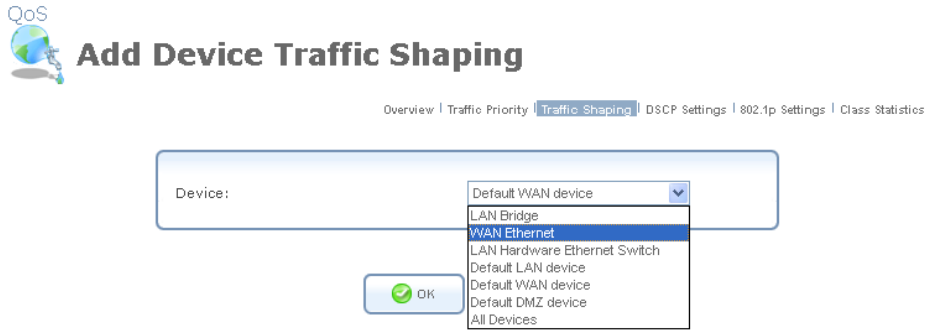


Figure 7.151. Add Device Traffic Shaping

4. Click 'OK'. The 'Edit Device Traffic Shaping' screen appears (see figure Figure 7.152).

Figure 7.152. Edit Device Traffic Shaping

7.4.4.3. Tx Traffic Shaping

The bandwidth of a device can be divided in order to reserve constant portions of bandwidth to predefined traffic types. Such a portion is known as a Shaping Class. When not used by its predefined traffic type, or owner (for example VoIP), the class will be available to all other traffic. However when needed, the entire class is reserved solely for its owner. Moreover, you can limit the maximum bandwidth that a class can use even if the entire bandwidth is available. Configure the following fields:

Tx Bandwidth This parameter limits the gateway's bandwidth transmission rate. The purpose is to limit the bandwidth of the WAN device to that of the weakest outbound link, for instance, the DSL speed provided by the ISP. This forces OpenRG to be the network bottleneck, where sophisticated QoS prioritization can be performed. If the device's bandwidth is not limited correctly, the bottleneck will be in an unknown router or modem on the network path, rendering OpenRG QoS useless.

TCP Serialization You can enable TCP Serialization in its combo box, either for active voice calls only or for all traffic. The screen will refresh, adding a 'Maximum Delay' field (see figure Figure 7.153). This function allows

you to define the maximal allowed transmission time frame (in milliseconds) of a single packet. Any packet that requires a longer time to be transmitted, will be fragmented to smaller sections. This avoids transmission of large, bursty packets that may cause delay or jitter for real-time traffic such as VoIP. If you insert a delay value in milliseconds, the delay in number of bytes will be automatically updated on refresh.

Figure 7.153. TCP Serialization - Maximum Delay

Queue Policy Tx traffic queueing can be based on a shaping class (see the following explanations) or on the pre-defined priority levels (refer to section Section 7.4.3). However, when the unlimited bandwidth is selected for the Tx traffic, the queue policy can be based only on the pre-defined priority levels.
To define a Tx Traffic Shaping Class:

1. Click the New Entry link in the 'Tx Traffic Shaping' section of the 'Edit Device Traffic Shaping' screen (see figure Figure 7.152). The 'Add Shaping Class' screen appears (see figure Figure 7.154).

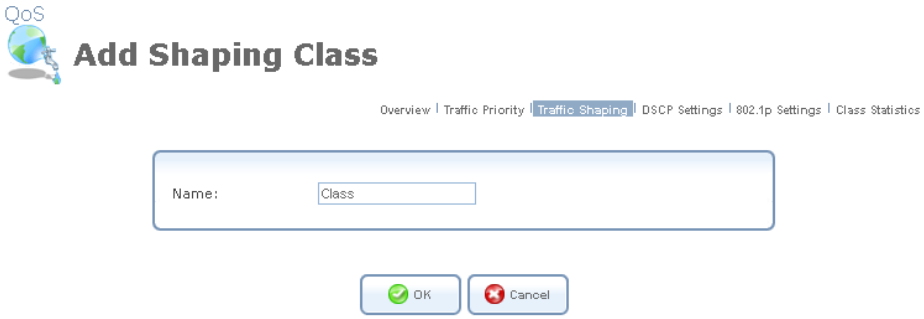


Figure 7.154. Add Shaping Class

2. Name the new class and click 'OK' to save the settings, e.g. Class A.
3. Back in the 'Edit Device Traffic Shaping' screen, click the class name to edit the shaping class. Alternatively, click its action icon . The 'Edit Shaping Class' screen appears (see figure Figure 7.155).

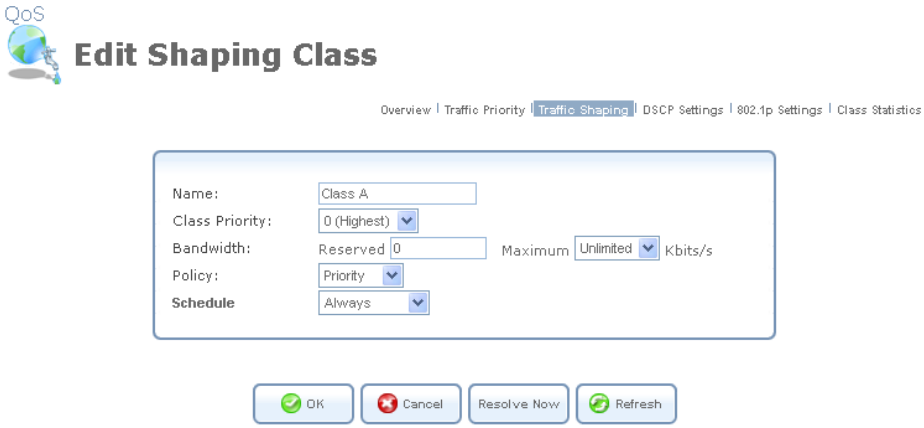


Figure 7.155. Edit Shaping Class

Configure the following fields:

Name The name of the class.

Class Priority The class can be granted one of eight priority levels, zero being the highest and seven the lowest (note the obversion when compared to the rules priority levels). This level sets the priority of a class in comparison to other classes on the device.

Bandwidth The reserved transmission bandwidth in kilo-bits per second. You can limit the maximum allowed bandwidth by selecting the 'Specify' option in the combo box. The screen will refresh, adding yet another Kbits/s field (see figure Figure 7.156).

Figure 7.156. Specify Maximum Bandwidth

Policy The class policy determines the policy of routing packets inside the class. Select one of the four options:

Priority Priority queuing utilizes multiple queues, so that traffic is distributed among queues based on priority. This priority is defined according to packet's priority, which can be defined explicitly, by a DSCP value (see section Section 7.4.5), or by a 802.1p value (see section Section 7.4.6).

FIFO The "First In, First Out" priority queue. This queue ignores any previously-marked priority that packets may have.

Fairness The fairness algorithm ensures no starvation by granting all packets a certain level of priority.

RED The Random Early Detection algorithm utilizes statistical methods to drop packets in a "probabilistic" way before queues overflow. Dropping packets in this way slows a source down enough to keep the queue steady and reduces the number of packets that would be lost when a queue overflows and a host is transmitting at a high rate.

WRR Weighted Round Robin utilizes a process scheduling function that prioritizes traffic according to the pre-defined 'Weight' parameter of a traffic's class. This level of prioritizing provides more flexibility in distributing bandwidth between traffic types, by defining additional classes within a parent class.

Schedule By default, the class will always be active. However, you can configure scheduler rules in order to define time segments during which the class may be active. To learn how to configure scheduler rules please refer to section Section 8.9.3.

7.4.4.4. Rx Traffic Policing

Configure the following fields:

Rx Bandwidth This parameter specifies the maximum traffic the policing can receive from the ISP.
To define an Rx Traffic Policy Class:

1. Click the New Entry link in the 'Rx Traffic Policing' section of the 'Edit Device Traffic Shaping' screen (see figure Figure 7.152). The 'Add Class' screen will appear (see figure Figure 7.157).

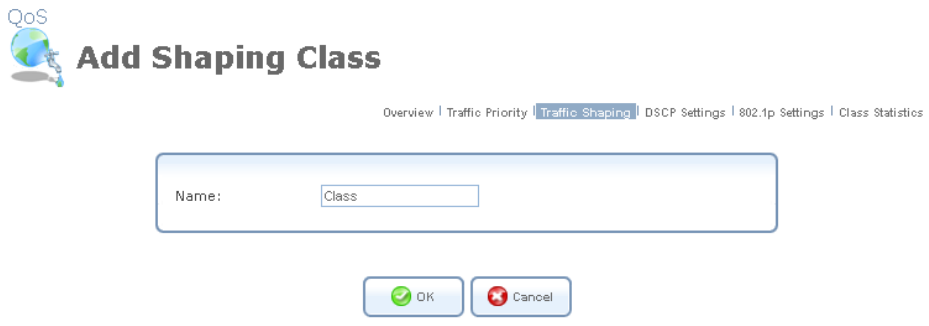


Figure 7.157. Add Shaping Class

2. Name the new class and click 'OK' to save the settings, e.g. Class B.

3. Back in the 'Edit Device Traffic Shaping' screen, click the class name to edit the shaping class. Alternatively, click its action icon . The 'Edit Policing Class' screen appears.

Figure 7.158. Edit Policing Class

Configure the following fields:

Name The name of the class.

Bandwidth The reserved reception bandwidth in kilo-bits per second. You can limit the maximum allowed bandwidth by selecting the 'Specify' option in the combo box. The screen will refresh, adding yet another Kbits/s field (see figure Figure 7.159).

Figure 7.159. Specify Maximum Bandwidth

Schedule By default, the class will always be active. However, you can configure scheduler rules in order to define time segments during which the class may be active. To learn how to configure scheduler rules please refer to section Section 8.9.3.

7.4.5. Differentiated Services Code Point Settings

In order to understand what is Differentiated Services Code Point (DSCP), one must first be familiarized with the Differentiated Services model. Differentiated Services (Diffserv) is a Class of Service (CoS) model that enhances best-effort Internet services by differentiating traffic by users, service requirements and other criteria. Packets are specifically marked, allowing network nodes to provide different levels of service, as appropriate for voice calls, video playback or other delay-sensitive applications, via priority queuing or bandwidth allocation, or by choosing dedicated routes for specific traffic flows. Diffserv defines a field in IP packet headers referred to as DSCP. Hosts or routers passing traffic to a Diffserv-enabled network will typically mark each transmitted packet with an appropriate DSCP. The DSCP markings are used by Diffserv network routers to appropriately classify packets and to apply particular queue handling or scheduling behavior. OpenRG provides a table of predefined DSCP values, which are mapped to 802.1p priority marking method (see section Section 7.4.6). You can edit or delete any of the existing DSCP setting, as well as add new entries.

1. Click 'DSCP Settings' under the QoS tab in the 'Services' screen. The following screen appears.

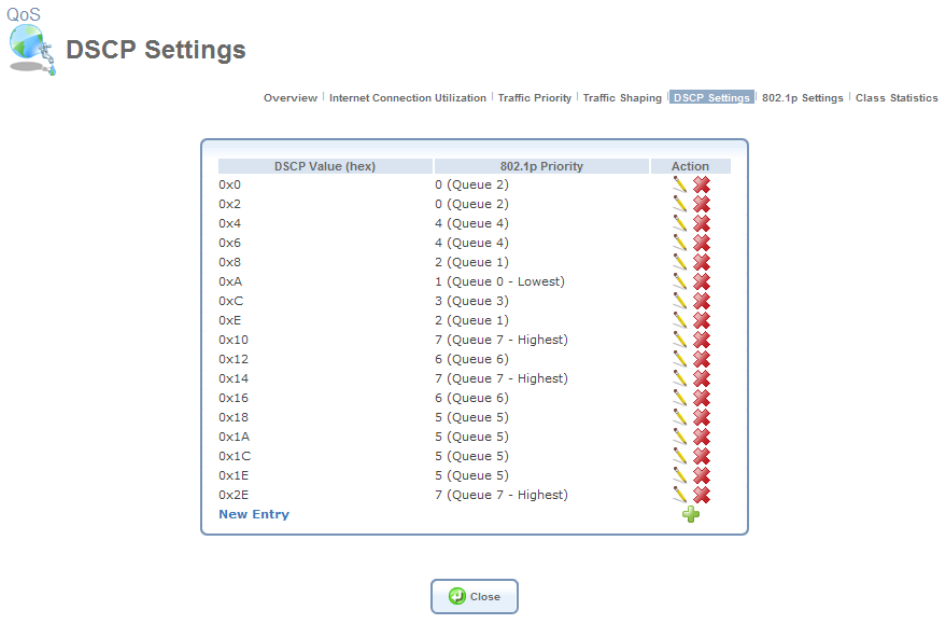

QoS
DSCP Settings
Overview | Internet Connection Utilization | Traffic Priority | Traffic Shaping | DSCP Settings | 802.1p Settings | Class Statistics
DSCP Value (hex)
802.1p Priority
Action
0x0 0 (Queue 2)
0x2 0 (Queue 2)
0x4 4 (Queue 4)
0x6 4 (Queue 4)
0x8 2 (Queue 1)
0xA 1 (Queue 0 - Lowest)
0xC 3 (Queue 3)
0xE 2 (Queue 1)
0x10 7 (Queue 7 - Highest)
0x12 6 (Queue 6)
0x14 7 (Queue 7 - Highest)
0x16 6 (Queue 6)
0x18 5 (Queue 5)
0x1A 5 (Queue 5)
0x1C 5 (Queue 5)
0x1E 5 (Queue 5)
0x2E 7 (Queue 7 - Highest)
New Entry
Close

Figure 7.160. DSCP--Traffic Priority Matching

Each DSCP value is assigned a default queue number as a part of its 802.1p priority settings. OpenRG's QoS supports up to eight queues, where Queue 0 has the lowest priority.

2. To edit an existing entry, click its action icon . To add a new entry, click the 'New Entry' link. The 'Edit DSCP Settings' screen appears.

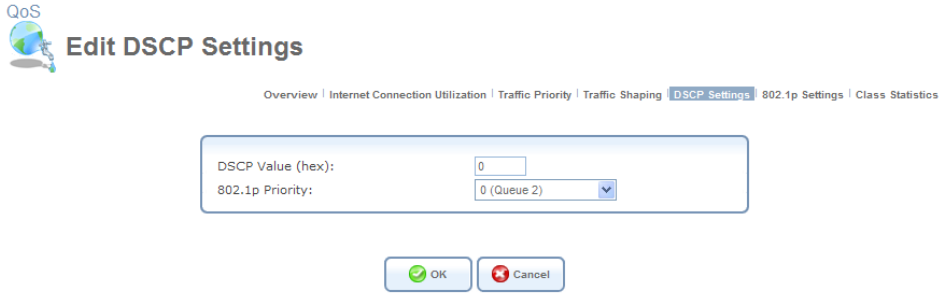


Figure 7.161. Edit DSCP Settings

3. Configure the following fields:
   DSCP Value (hex) Enter a hexadecimal number that will serve as the DSCP value.

   802.1p Priority Select a 802.1p priority level from the drop-down menu.

4. Click 'OK' to save the settings.

Note that the DSCP value overriding the priority of incoming packets with an unassigned value (priority 0, assumed to be a no-priority-set) is "0x0".

7.4.6. 802.1p Settings

The IEEE 802.1p priority marking method is a standard for prioritizing network traffic at the data link/Mac sub-layer. 802.1p traffic is simply classified and sent to the destination, with no bandwidth reservations established. The 802.1p header includes a 3-bit prioritization field, which allows packets to be grouped into eight levels of

priority (0-7), where level 7 is the highest one. In addition, OpenRG maps these eight levels to priority queues, where Queue 0 has the lowest priority. OpenRG's QoS supports up to eight queues. By default, the higher the level and queue values, the more priority they receive. Therefore, the more critical the traffic is, the higher priority level and queue number it should receive. To change the mapping between a priority value and a queue value, perform the following:

1. Click '802.1p Settings' under the QoS tab in the 'Services' screen. The following screen appears.

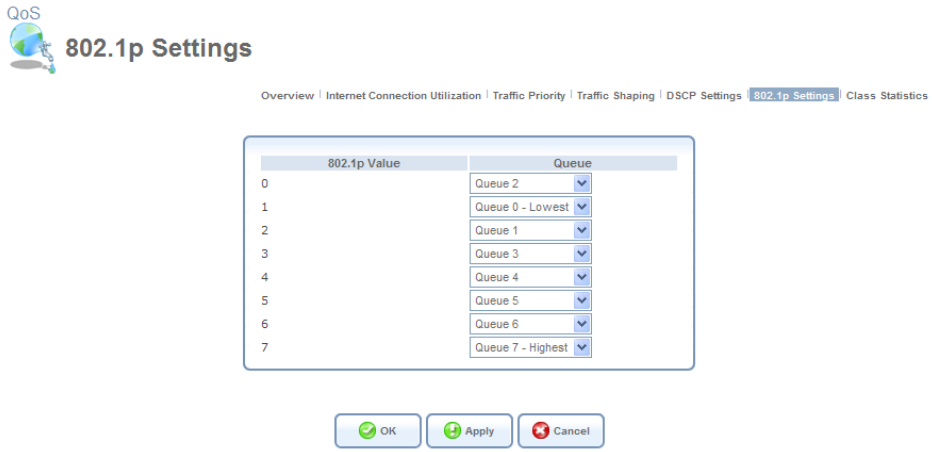


Figure 7.162. Traffic Queuing in 802.1p Settings

2. From the corresponding drop-down menu, select a desired value.

3. Click 'OK' to save the settings.

7.4.7. Class Statistics

OpenRG provides you with accurate, real-time information on the traffic moving through your defined device classes. For example, the amount of packets sent, dropped or delayed, are just a few of the parameters that you can monitor per each shaping class. To view your class statistics, click 'Class Statistics' under the QoS tab in the 'Services' screen. The following screen will appear (see figure Figure 7.163). Note that class statistics will only be available after defining at least one class (otherwise the screen will not present any information).

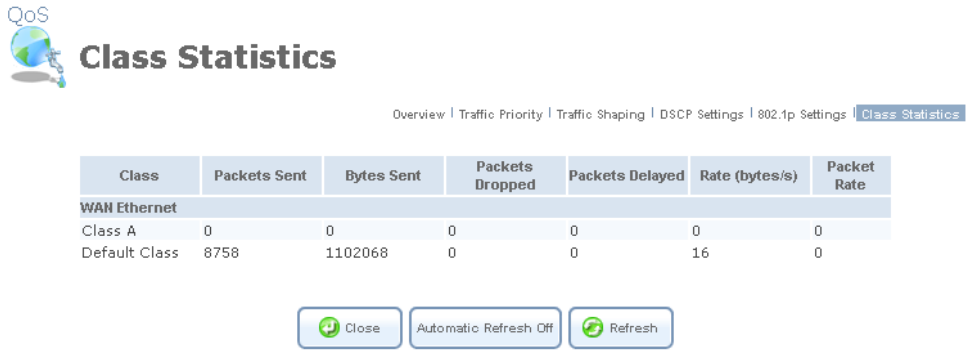


Figure 7.163. Class Statistics

7.4.8. Voice QoS Scenario

In order to gain a better understanding of the Quality of Service concept, the following section presents a scenario where the WAN bandwidth is shaped to provide priority to a voice stream. When shared by a Voice over IP (VoIP) conversation and a file transfer, the bandwidth will normally be exploited by the file transfer, reducing the

quality of the conversation or even casuing it to disconnect. With QoS, the VoIP conversation, which is a real-time session, receives the priority it requires, maintaining a high level of voice quality.

7.4.8.1. Hardware Requirements

- A gateway runnning OpenRG
- Two IP phones
- A LAN computer running an FTP client, containing a large file (100MB)
- A WAN computer running an FTP server

7.4.8.2. Physical Setup

1. Connect an IP phone and the LAN computer to OpenRG's LAN ports.
2. Connect OpenRG's WAN port to your network. The second IP phone and the WAN computer should be available on the WAN.

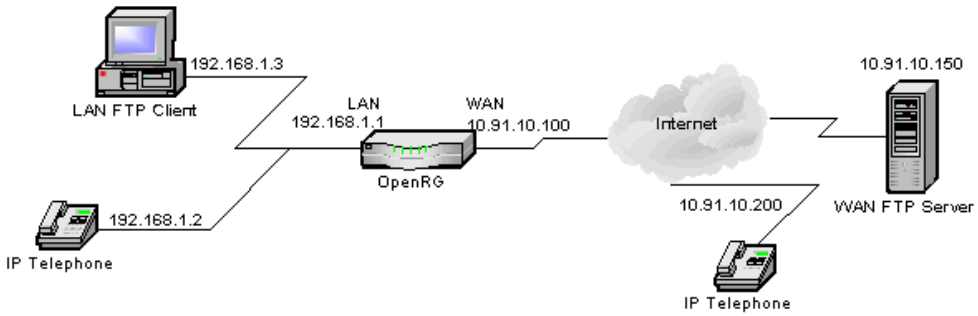


Figure 7.164. Physical Setup

7.4.8.3. Scenario Configuration

1. Configure OpenRG and all other devices with the static IPs described in figure Figure 7.164 .
2. Define a global service for the VoIP stream over a SIP protocol:

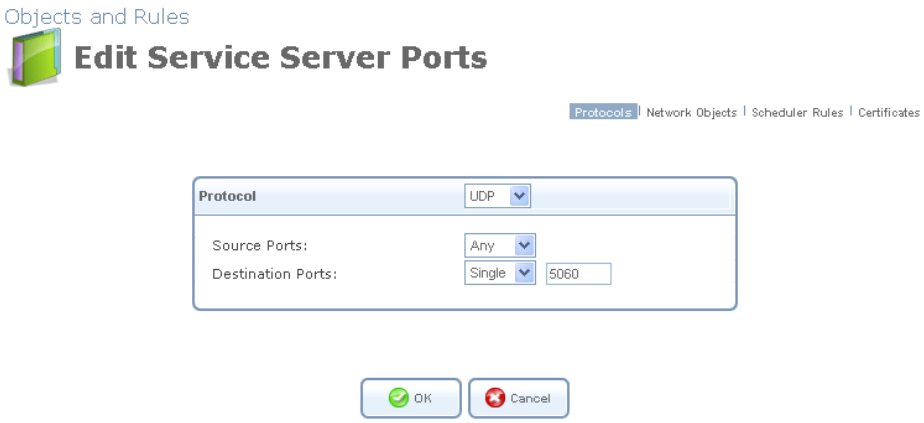


Figure 7.166. Edit Service Server Ports

1. In OpenRG's WBM, click the 'Protocols' icon in the 'Advanced' screen, and then click the 'New Entry' link. The 'Edit Service' screen appears (see figure Figure 7.165).

2. Enter "SIP" as the service name. You may also add a description for the service.

Figure 7.165. Edit Service

3. Click the 'New Server Ports' link. The 'Edit Service Server Ports' screen appears (see figure Figure 7.166).

4. From the drop-down menu, select the UDP protocol. The screen will refresh.

5. Verify that "Any" is selected from the 'Source Ports' drop-down menu.

6. From the 'Destination Ports' drop-down menu, select "Single". The screen will refresh again.

7. Enter 5060 as the single destination port.

8. Click 'OK' to save the settings.

3. Limit the bandwidth of OpenRG's WAN device:

1. Click 'Traffic Shaping' under the 'QoS' tab in the 'Services' screen. The following screen appears (see figure Figure 7.167).

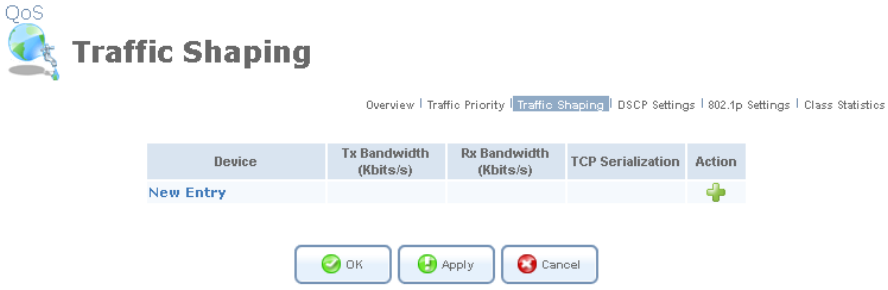


Figure 7.167. Traffic Shaping

2. Click the 'New Entry' link, and select 'All Devices' from the drop-down menu (see figure Figure 7.168).

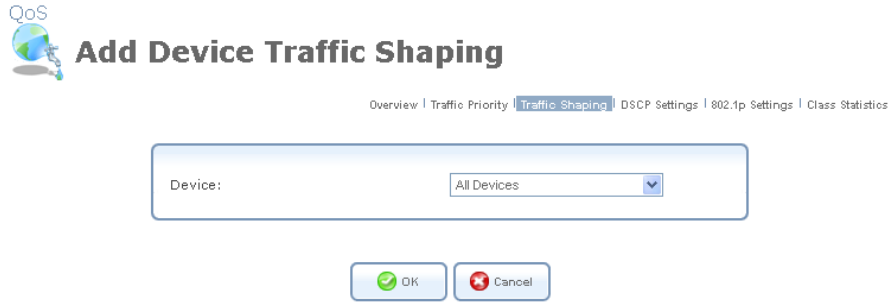


Figure 7.168. Add Device Traffic Shaping

3. Click 'OK'. The 'Edit Device Traffic Shaping' screen appears (see figure Figure 7.169).
4. Enter 200 Kbps in the Tx Bandwidth field.
5. Enter 200 Kbps in the Rx Bandwidth field.
6. Verify that TCP Serialization is disabled.

Figure 7.169. Edit Device Traffic Shaping

4. Configure a QoS class for the Tx and Rx VoIP streams. Perform this procedure twice: once for Tx Traffic Shaping and once for Rx Traffic Policing.
    1. Click the 'New Entry' link in the Tx/Rx traffic shaping section of the 'Edit Device Traffic Shaping' screen. The 'Add Class' screen will appear (see figure Figure 7.170).
    2. Name the new class "VoIP Tx/Rx", and click 'OK' to save the settings.

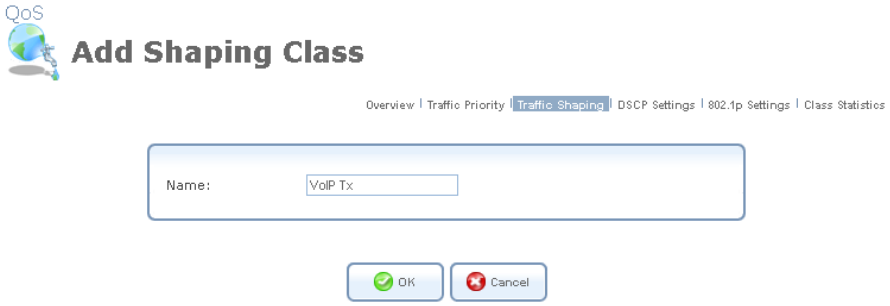


Figure 7.170. Add Shaping Class

3. Uncheck the entry in the Class ID column to disable the class at this point (see figure Figure 7.171).

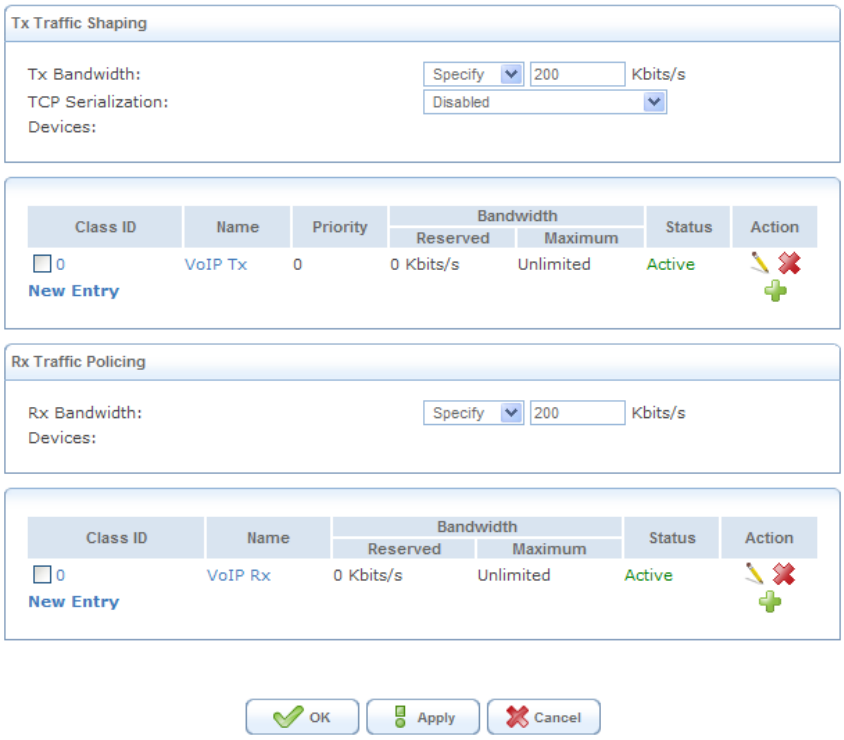


Figure 7.171. Shaping Classes - Uncheck the Class ID

4. Click the class name to edit the shaping class. Alternatively, click its action icon . The 'Edit Class' screen appears (see figure Figure 7.172).

5. Enter 100 Kbps in the Reserved Tx/Rx Bandwidth field.

6. Leave all other fields at their default values.

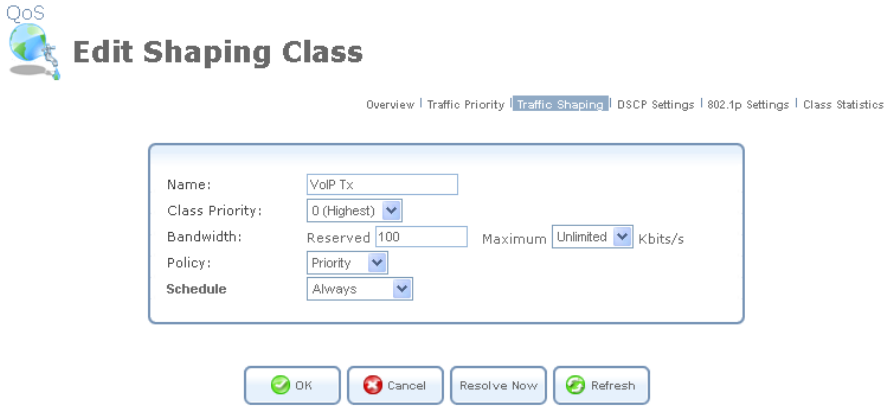


Figure 7.172. Edit Shaping Class

7. Click 'OK' to save the settings.

8. Click 'OK' once more in the 'Edit Device Traffic Shaping' screen to save all settings.

5. Define and associate class rules:

1. Click 'Traffic Priority' under the 'QoS' tab in the 'Services' screen. The 'Traffic Priority' screen appears (see figure Figure 7.173).

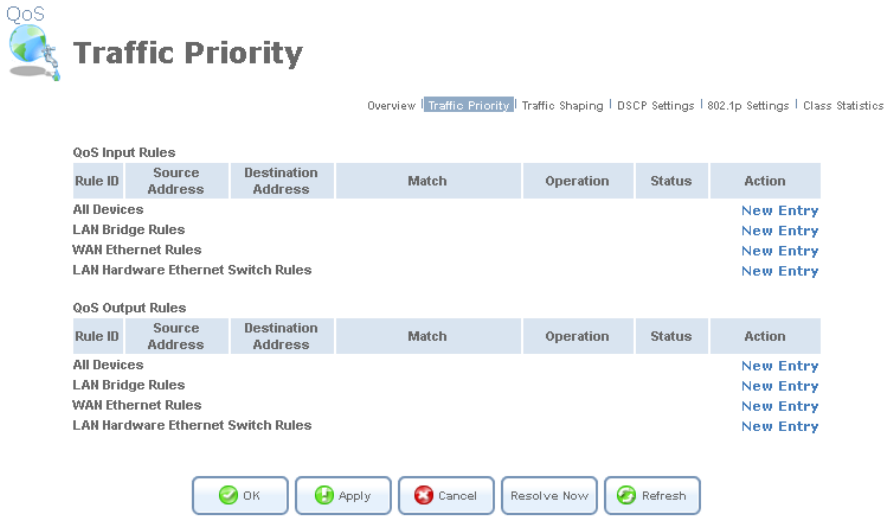


Figure 7.173. Traffic Priority

2. Click the 'New Entry' link of the 'WAN Ethernet Rules' under the 'QoS Output Rules' section. The 'Add Traffic Priority Rule' screen appears (see figure Figure 7.174).

Figure 7.174. Add Traffic Priority Rule

3. In the 'Matching' section, select 'Show All Services' from the 'Protocol' drop-down menu, and then select "SIP". The screen will refresh displaying the protocol parameters (see figure Figure 7.175).

4. In the 'Operation' section, check the 'Set Rx/Tx Class Name' check boxes, and select 'VoIP Rx/Tx' from the drop-down menus that appear (see figure Figure 7.175).

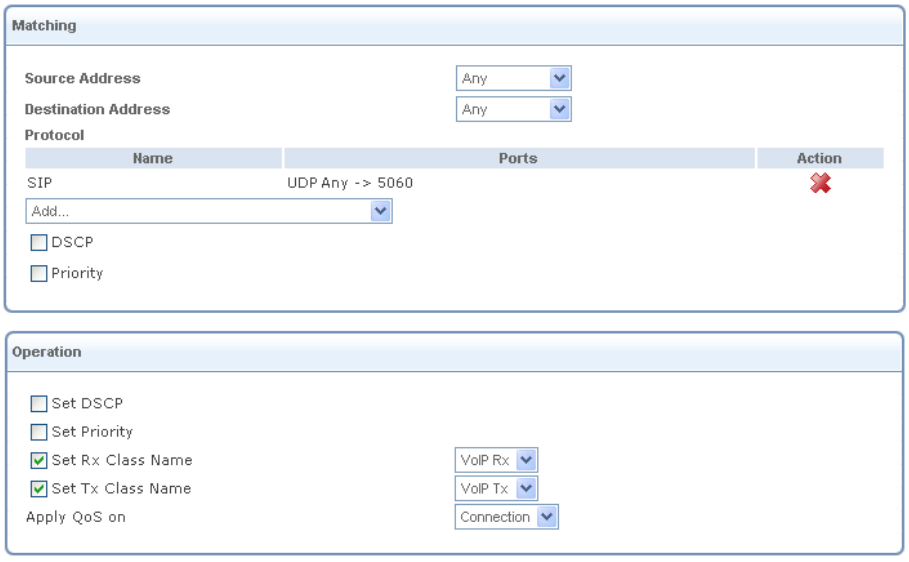


Figure 7.175. Add Traffic Priority Rule--SIP Protocol

5. Leave all other fields at their default values, and click 'OK' to save the settings.

7.4.8.3.1. Implementing the WRR Class Policy in VoIP's QoS

The WRR class policy enables you to fine-tune your Tx traffic priority settings. For instance, in a scenario where you utilize more than one VoIP protocol (for example, SIP and H.323), you can further prioritize VoIP's Tx traffic. In the following example, the SIP protocol is given preference over H.323. Therefore, you may assign 70% of the VoIP bandwidth to the SIP-based traffic, and 30% to the H.323-based traffic. To enable the WRR class policy, perform the following:

1. In the 'Edit Device Traffic Shaping' screen (see figure Figure 7.171), click the 'VoIP Tx' link. The 'Edit Shaping Class' screen appears (see figure Figure 7.172).

2. From the 'Policy' drop-down menu, select the WRR option. The screen refreshes, and a new section called 'Subclasses' is added.

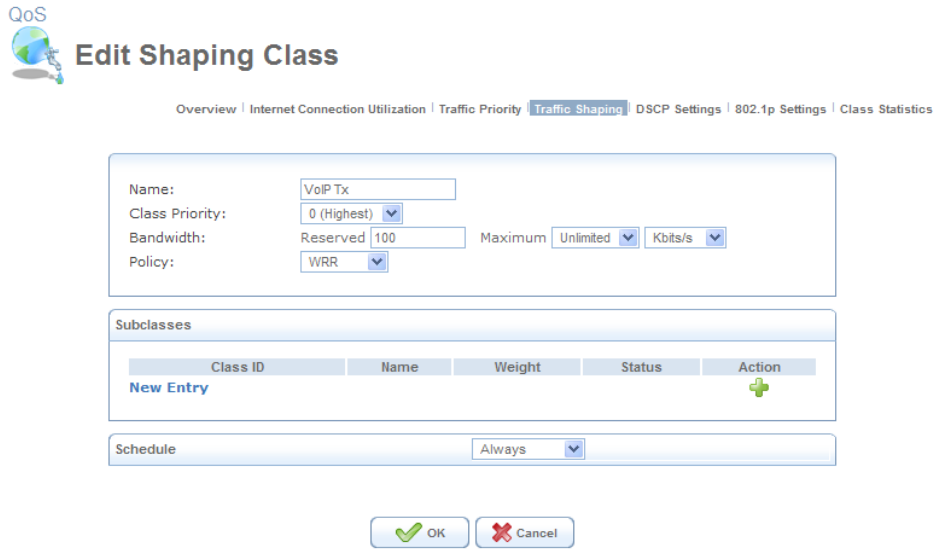


Figure 7.176. Subclasses Section in Edit Shaping Class

3. In the 'Subclasses' section, click either the 'New Entry' link or the action icon . The 'Add Shaping Class' screen appears.

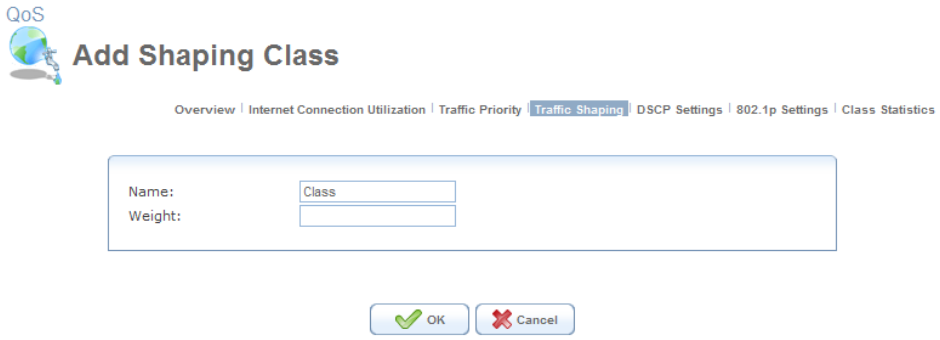


Figure 7.177. Add Shaping Class

This time, the screen contains two fields: 'Name' and 'Weight'.

4. In the 'Name' field, enter 'SIP' for the name of a VoIP's subclass assigned to the SIP-based traffic.

5. In the 'Weight' field, enter a numeric value that correlates with the amount of bandwidth you want to grant to the subclass. In the current example, the subclass is granted 70% of VoIP's Tx traffic. Therefore, enter **7** in the 'Weight' field.

> Note: The class weight range is between 1 and 10000.

6. Click 'OK' to save the settings.

Repeat the same procedure for creating the H.323 subclass of VoIP. However, in the 'Weight' field enter **3** that corresponds to 30% of the VoIP bandwidth you want to assign to the H.323 subclass.

> Note: When you activate the WRR class policy, it is not mandatory to define an Rx shaping class and its priority rules.

Once the subclasses are created, define the priority rules for the subclasses, as follows:

1. Click 'Traffic Priority' under the 'QoS' tab in the 'Services' screen. The 'Traffic Priority' screen appears (see figure Figure 7.173).

2. Click the 'New Entry' link of the 'WAN Ethernet Rules' under the 'QoS Output Rules' section. The 'Add Traffic Priority Rule' screen appears (see figure Figure 7.174).

3. In the 'Matching' section, select 'Show All Services' in the 'Protocol' drop-down menu, and then select 'SIP'. The screen refreshes displaying the protocol parameters.

> Note: You can also define the 'SIP' protocol manually, as described in section Section 7.4.8.3 .

4. In the 'Operation' section, check the 'Set Tx Class Name' check box, and select 'SIP' in the drop-down menu that appears.

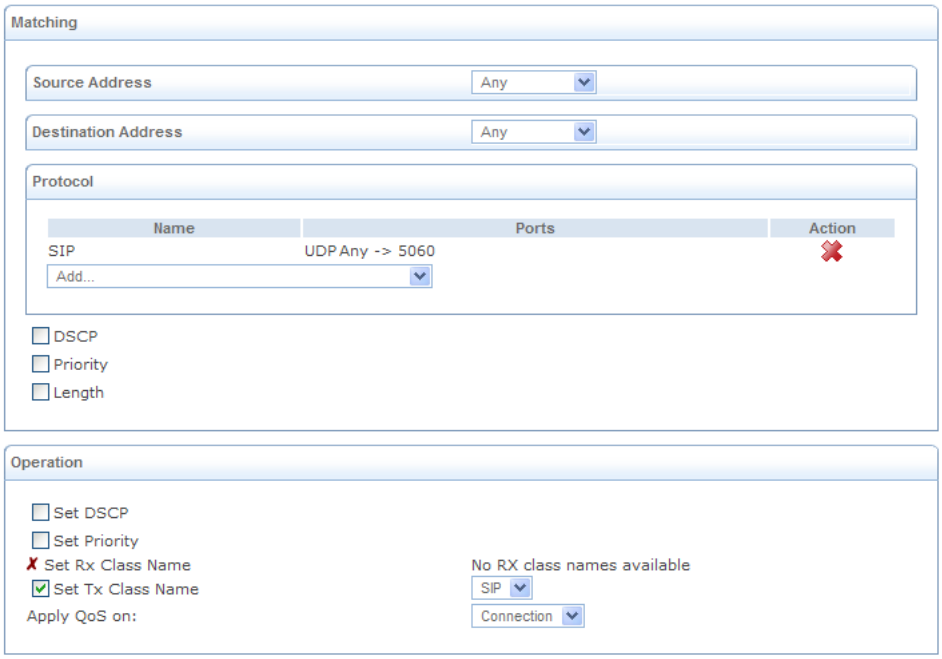


Figure 7.178. Add Traffic Priority Rule--SIP Protocol

5. Leave all other fields at their default values, and click 'OK' to save the settings.

Repeat the same procedure for defining a priority rule for the H.323 subclass. The only difference is that you should select the 'H.323 Call Signaling' value for the protocol settings, and 'H.323' for the Tx class name.

7.4.8.4. Running the Scenario

1. Initiate a direct call (using the SIP protocol) from one IP phone to the other. For VoIP configuration, please refer to section Section 7.6 . Verify that the conversation can be conducted clearly and adequately.

2. Initiate an FTP file upload from the LAN computer to the WAN computer. This can be done using the Windows command line. Use the **hash** command to utilize the pound sign process indicator before starting the file transfer. As soon as the upload commences, your ability to transmit voice will be lost - the WAN party will not be able to hear you. The upload, on the other hand, will be proceeding rapidly, taking up all of your transmit bandwidth (see figure Figure 7.179).

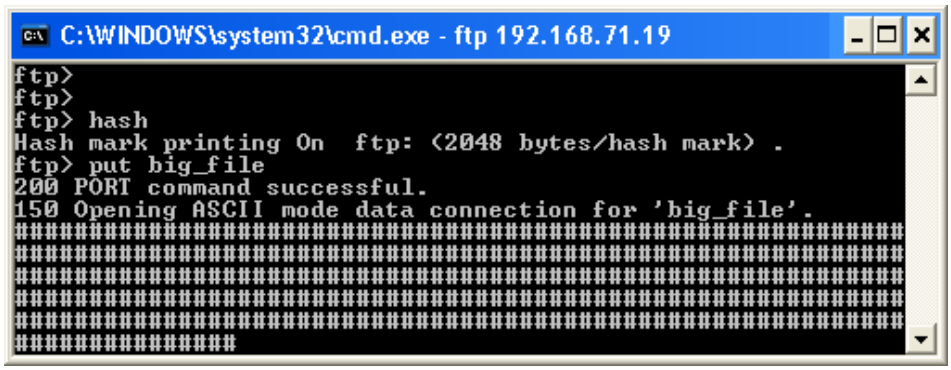

C:\WINDOWS\system32\cmd.exe - ftp 192.168.71.19
ftp>
ftp>
ftp> hash
Hash mark printing On ftp: (2048 bytes/hash mark) .
ftp> put big_file
200 PORT command successful.
150 Opening ASCII mode data connection for 'big_file'.

Figure 7.179. FTP Process

3. Activate QoS to restore the voice transmission:

    1. Click 'Traffic Shaping' under the 'QoS' tab in the 'Services' screen. The following screen appears (see figure Figure 7.180).

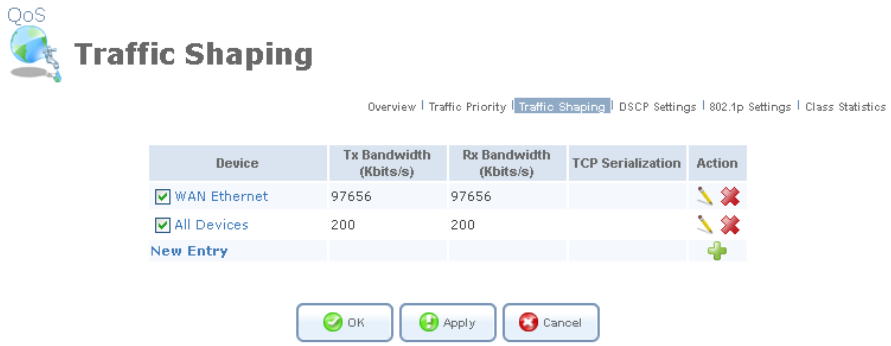


Figure 7.180. Traffic Shaping

    2. Click the Device name, in this case 'All devices', and check both entries in the Class ID column to enable the classes (see figure Figure 7.181).

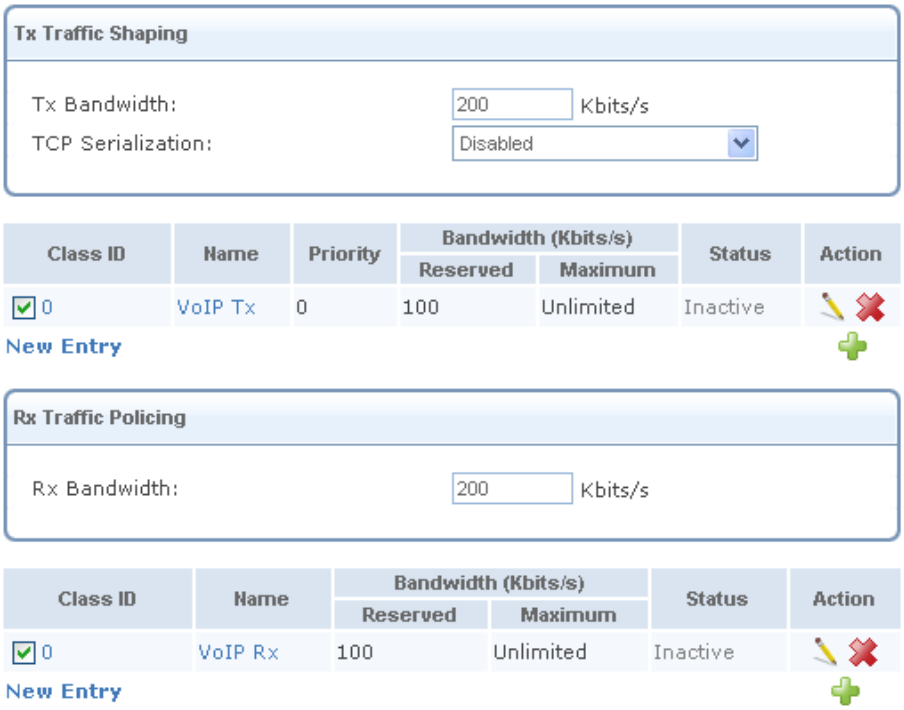


Figure 7.181. Shaping Classes - Check the Class ID

3. Click 'OK' to save the settings.

The transmission capability will be restored, as most of the bandwidth will now be reserved for the VoIP stream. The file upload rate, on the other hand, will obviously slow down.

Note: Some IP phones and ATA devices are preconfigured to send DSCP-marked data. OpenRG will handle such data with QoS priority, even if a QoS class is not configured for the VoIP stream. To run the above evaluation successfully, you must first disable DSCP marking on such devices.

7.5. Media Sharing

OpenRG's Media Sharing solution enables you to share and stream media files from a storage device connected to OpenRG. You can access the shared media files either from a LAN PC with an installed media rendering software, or from a **network-aware** Consumer Electronic (CE) device with a Universal Plug and Play (UPnP) media renderer (for more information about UPnP, refer to Section 8.7.1).

7.5.1. Configuring the Media Sharing Service

You can configure OpenRG's media sharing service by clicking its tab in WBM's 'Services' screen. The 'Media Sharing' screen appears.

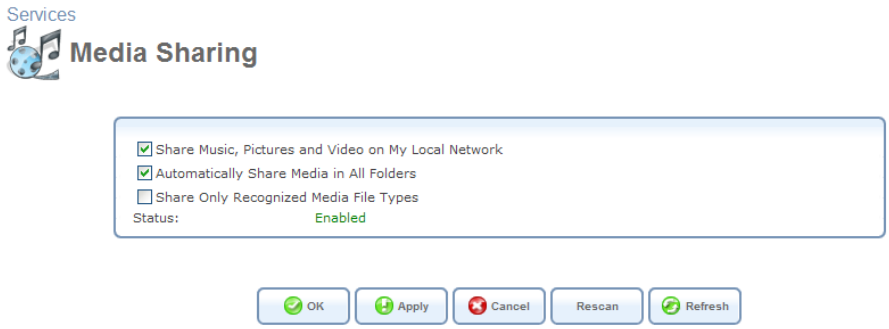


Figure 7.182. Media Sharing

Alternatively, the 'Media Sharing' screen can be reached by clicking the 'Media Sharing' icon in the following screens:

- 'Home'
- 'Overview' section of the 'Services' screen
- 'Advanced'

The 'Media Sharing' screen contains the following options:

Share Music, Pictures and Video on My Local Network By default, this option is selected. If you deselect this option, the Media Sharing service is disabled.

Automatically Share Media in All Folders By default, this option is selected, causing all partitions and folders on the storage device to become shared automatically.

Share Only Recognized Media File Types When this option is selected, only media files in a supported file format are shared. OpenRG recognizes the following file formats:

- Audio: MP3, OGG, WAV, and WMA.
- Video: MPEG, MPG, MPE, ASF, AVI, DIVX, WMV, MOV, and QT.
- Graphics: JPEG, JPG, JPE, GIF, PNG, TIFF, TIF, and BMP.

Once a storage device is connected, OpenRG automatically scans it for media files. In addition, OpenRG adds the **MEDIASRV.DB** file to all the *writable* partitions it identifies. This file is mandatory for the proper functioning of the media sharing service.

Note: Unless your OpenRG is based on the Conexant Solos, Mindspeed Malindi2 or Freescale platform, an NTFS partition cannot be used for media sharing because it is only *readable*. OpenRG does not scan an NTFS partition for the presence of media files.

If you want to share a specific partition or folder, deselect the 'Automatically Share Media in All Folders' check box and click 'Apply'. The screen refreshes, changing to the following.

Figure 7.183. Manual Folder Sharing Mode

The 'Status' field changes to 'No Shares', and a new section appears, enabling you to create and manage a list of manually shared partitions and their folders. To share a folder on a specific partition, perform the following:

1. Click the 'Add Folder' link, or the action icon . The 'Folder Settings' screen appears.

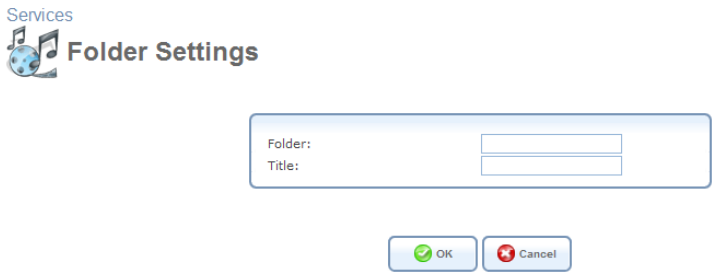


Figure 7.184. Folder Settings

2. In the 'Folder' field, enter the exact path (for example, **A/Music**, where 'A' is a partition's letter, and 'Music' is a folder on this partition).

Note: The partition's letter cannot be changed. OpenRG automatically assigns a letter to a partition, once the storage device is connected. For more information, refer to Section 6.4.

3. In the 'Title' field, enter a descriptive title for the folder (for example, 'Pop Music'). Note that entering this information is mandatory.

4. Click 'OK' to save the settings.

The 'Media Sharing' screen appears, displaying the shared partition. If necessary, repeat the same procedure to share additional partitions and their folders.

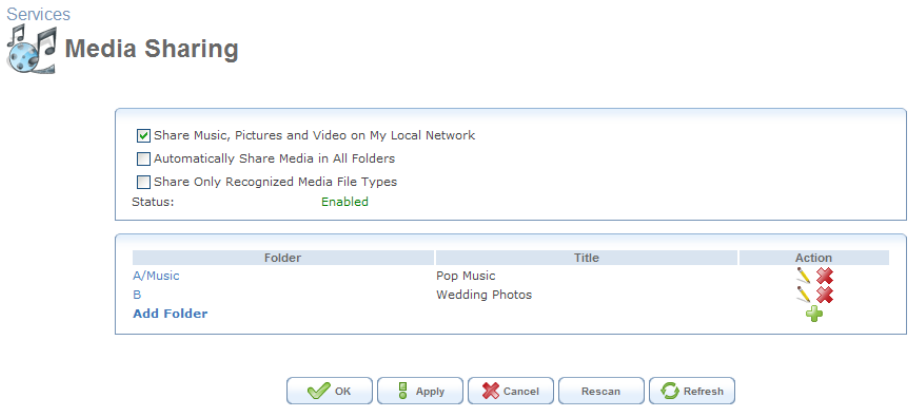


Figure 7.185. Manually Shared Partitions

At any time, you can edit the partition or folder sharing settings by clicking its action icon . In addition, you can remove a partition or a folder from the shares list by clicking its action icon .

Note: It is important to click the 'Rescan' button in WBM's 'Media Sharing' screen before trying to access the shared media remotely. Clicking the 'Rescan' button updates the media database with the current shared media content and its path. The more disk space the media files occupy, the longer the scanning process may take.

7.5.2. Accessing the Shared Media via LAN PC

You can remotely access the media content, shared via OpenRG, from any LAN PC on which a media rendering client application is installed. One of such applications is **Nero Home**. The following example utilizes Nero Home to demonstrate how to access the shared media via a LAN PC. After installing Nero Home, perform the following:

1. Launch the Nero Home application. Nero Home's main screen appears.

Figure 7.186. Nero Home's Main Screen

2. Click the 'MediaHome Network' link. The 'MediaHome Network' screen appears, displaying the available media servers.

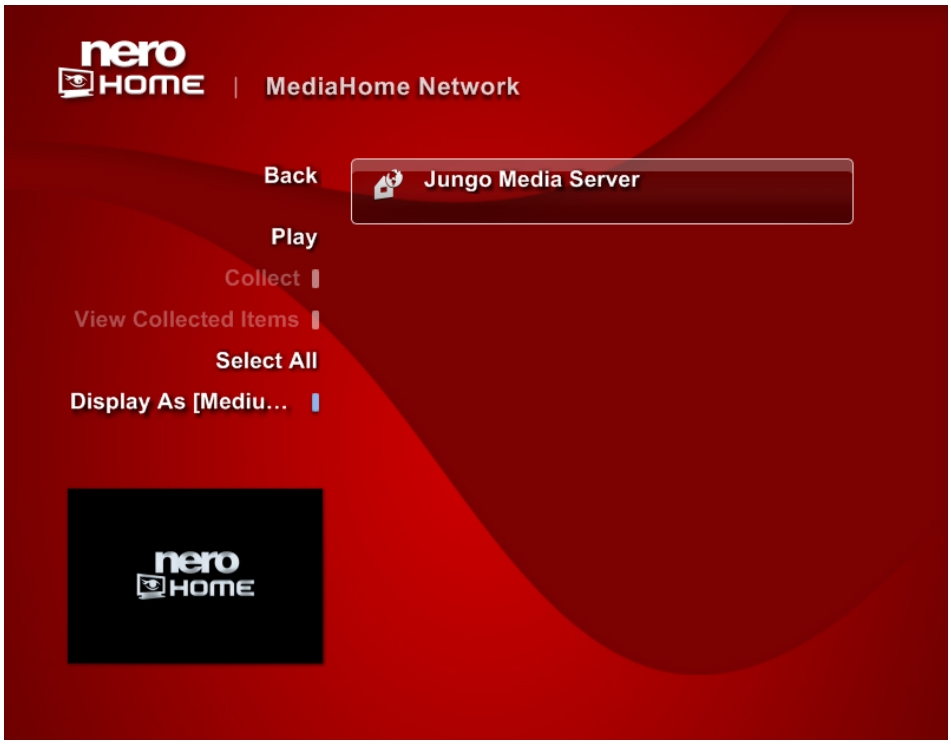


Figure 7.187. MediaHome Network

3. Click the 'Jungo Media Server' button. At this stage, there are differences between the automatic and manual sharing modes.

7.5.2.1. Automatic Partition Sharing Mode

If the automatic partition sharing option is enabled, the 'Jungo Media Server' screen displays the partitions of the storage device, as in the following screen.

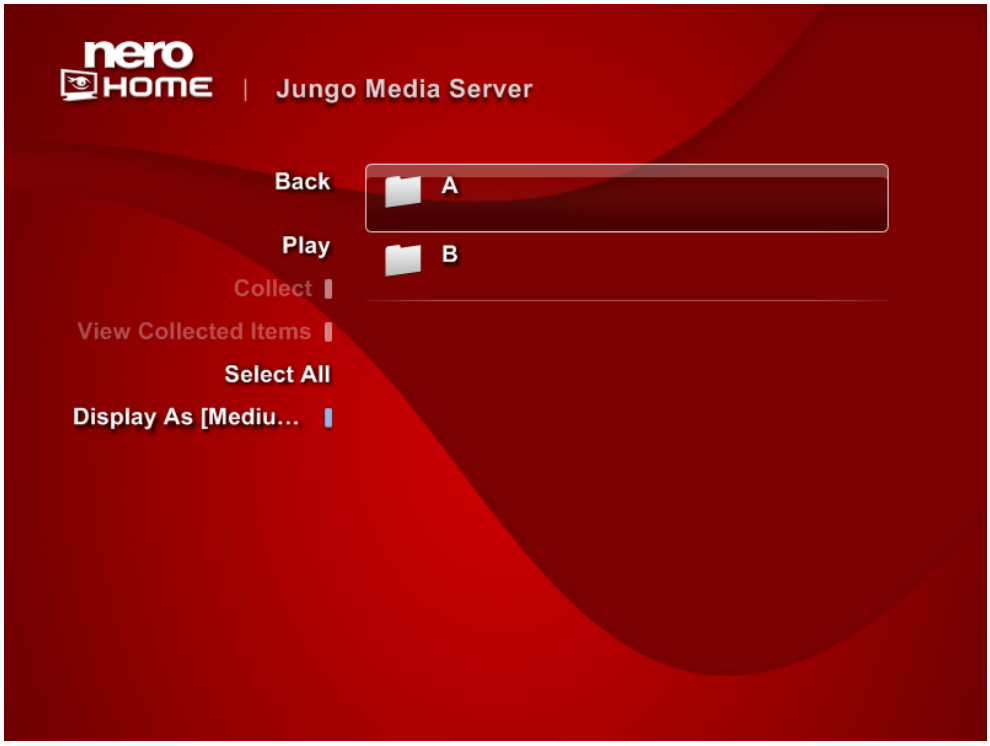


Figure 7.188. Jungo Media Server

To proceed, perform the following:

1. Click the name of a partition on which the media files are located. The following screen appears.

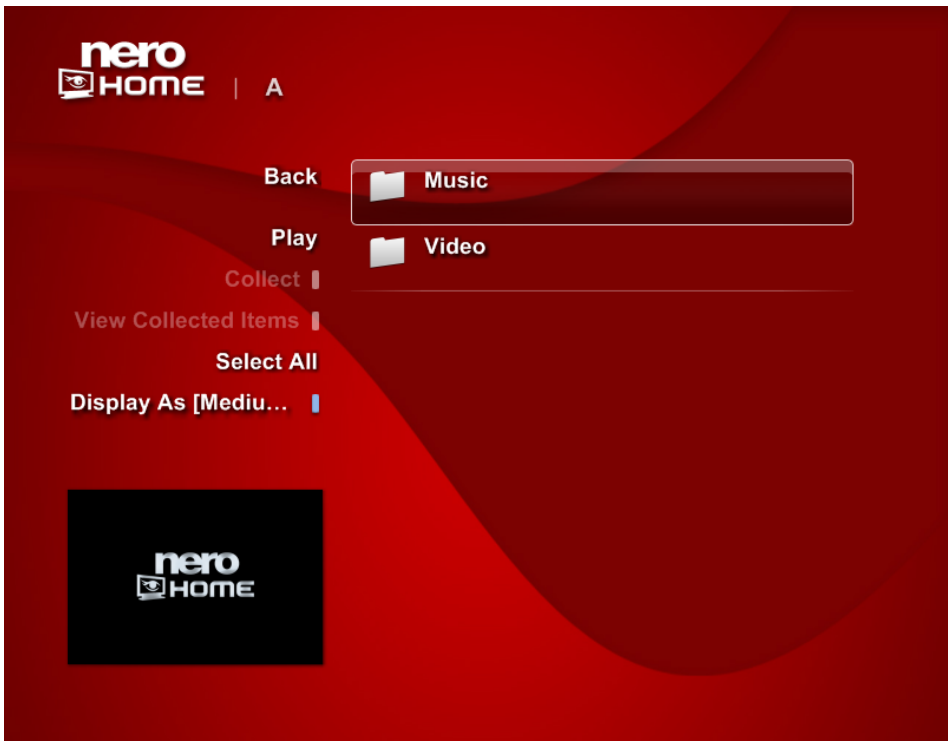


Figure 7.189. Media Directories on a Partition

Note: Nero Home displays the same directory hierarchies as on the storage device.

2. Click the name of a directory to view its contents. A list of shared files appears.

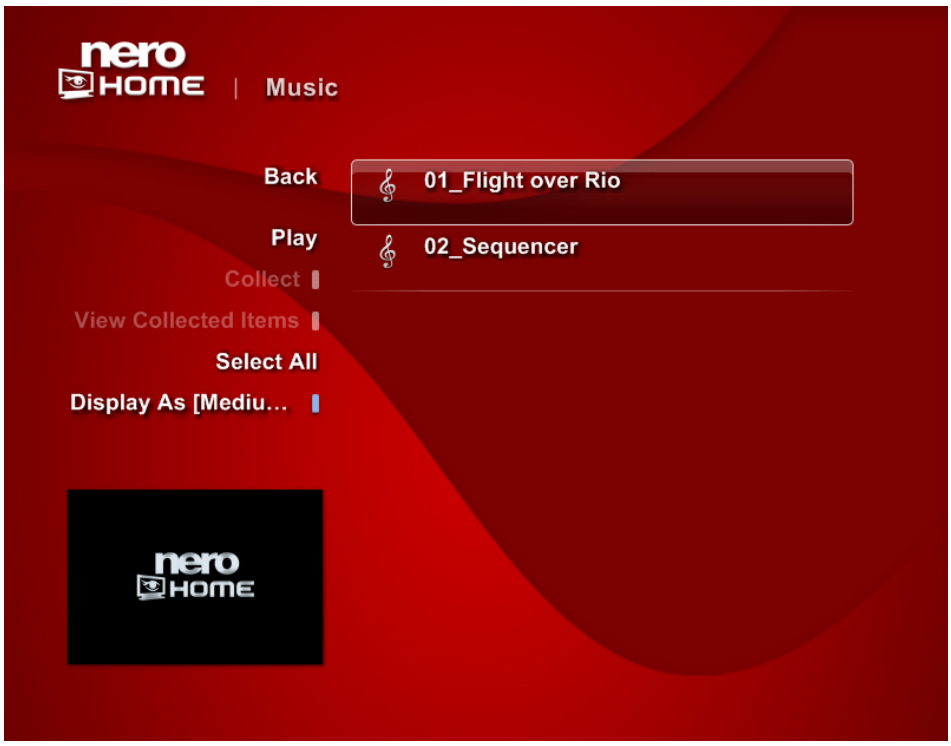


Figure 7.190. Media Files in the Shared Directory

3. Click 'Play' to open the file in a media player.

7.5.2.2. Manual Partition Sharing Mode

If the manual sharing mode is selected (automatic sharing mode is disabled), the following screen appears. In this case, the titles of the folders appear as you specified in the 'Title' field.

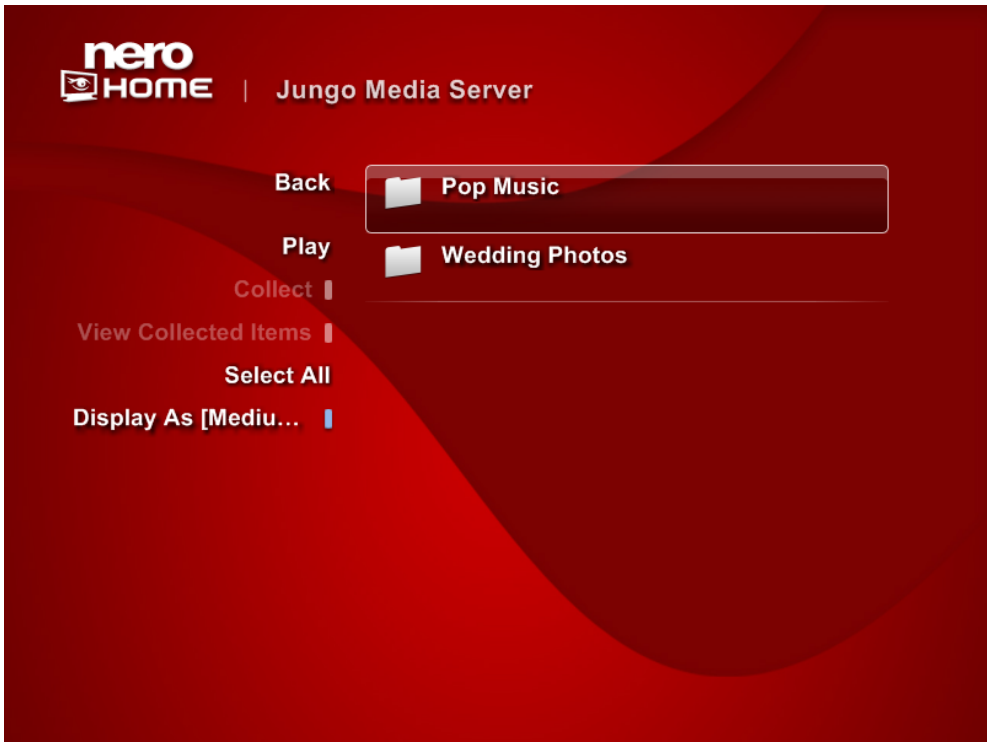


Figure 7.191. Manually Shared Folders

To proceed, perform the following:

1. Click the name of a directory to view its contents. A list of shared files appears.

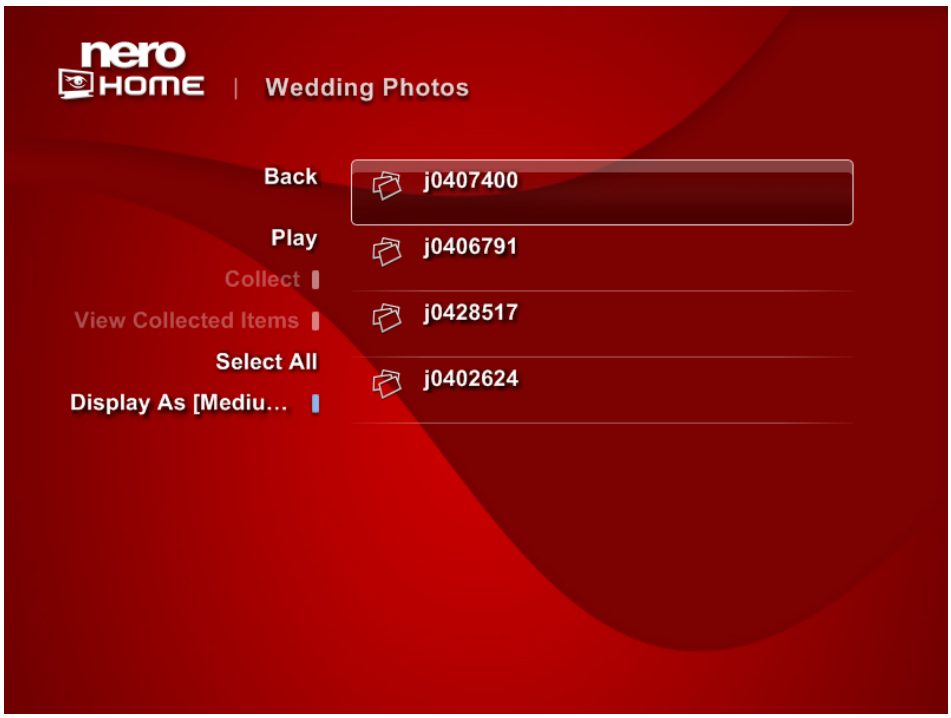


Figure 7.192. Media Files in the Shared Directory

2. Click 'Play' to open the file in a media player.

For more information about Nero Home operation, refer to the Nero Home Manual.

7.5.3. Accessing the Shared Media via UPnP Media Renderer

OpenRG's Media Sharing service enables you to stream the media files located on the shared storage via a network-aware media renderer, for instance a digital media player. Depending on your model of an OpenRG-powered gateway and media player, you can connect the media player to your network either via an Ethernet LAN device or through a wireless network card. Once connected, you can stream the shared media to a TV or stereo system, depending on the media format. For more information about the specific appliance, refer to its documentation.

7.6. Voice Over IP

OpenRG's Voice over IP (VoIP) solution allows you to connect multiple phones over a single broadband connection, providing the benefits and quality of digital voice. OpenRG enables you to place and receive calls over the Internet using a standard telephone set connected to OpenRG.

Note: Your OpenRG VoIP functionality is based on one of three VoIP stacks: oSIP, RADVISION or Asterisk. Some of the sections within this chapter refer to a specific VoIP solution, so make sure you know the type of solution found within your device.

7.6.1. Physical Setup

1. Verify that OpenRG is connected to the WAN as the gateway.

2. Connect a telephone to the gateway in any of the following methods:

1. Connect a standard Plain Old Telephone Service (POTS) telephone to one of the available telephone ports on the gateway.

2. Connect a POTS telephone to a LAN port on the gateway, using an Analog Telephone Adaptor (ATA) unit.

3. Connect an IP telephone to a LAN port on the gateway.

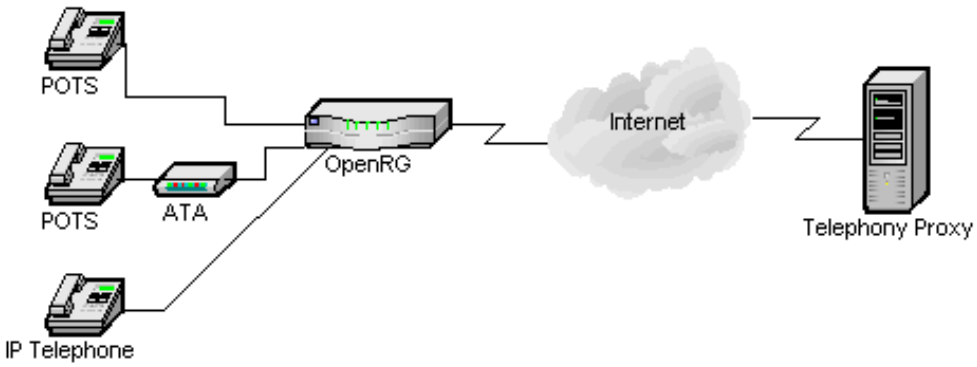


Figure 7.193. Telephony Physical Setup

7.6.2. Line Settings

Access the VoIP settings by clicking the 'Voice' tab under the 'Services' screen. The 'Line Settings' screen appears, allowing you to define and configure OpenRG's phone ports.

Figure 7.194. Line Settings

This screen presents the configuration of the different lines. Before starting to make phone calls, you need to configure each line's parameters. You can manage which line is operational by marking the check box next to it, and configure its parameters by clicking its action icon . The following sections describe this configuration for all versions.

7.6.2.1. Line Parameters (oSIP)

Click a telephone line's action icon to configure its settings:

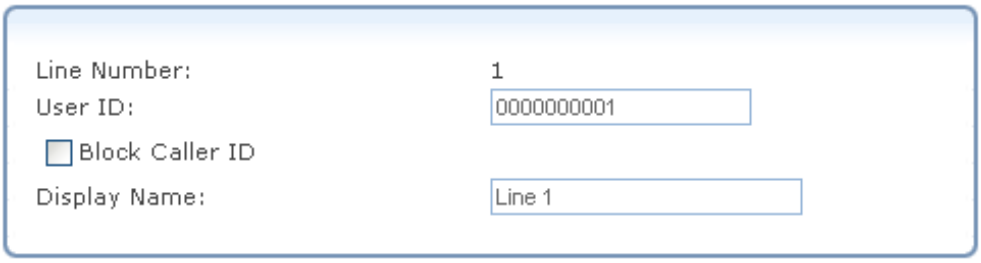


Figure 7.195. General Line Parameters

Line Number A telephone port in OpenRG to which you can connect a standard (POTS) telephone.

User ID This telephone's VoIP user ID, used for identification to initiate and accept calls.

Block Caller ID Select this check box to hide your ID from the remote party.

Display Name A free text description which will be displayed to remote parties as your caller ID.

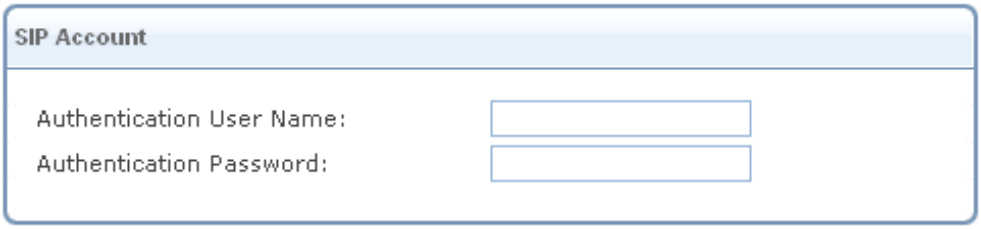


Figure 7.196. Line Parameters -- SIP Account

Authentication User Name The login name used for authentication with the proxy.

Authentication Password The password used for authentication with the proxy.

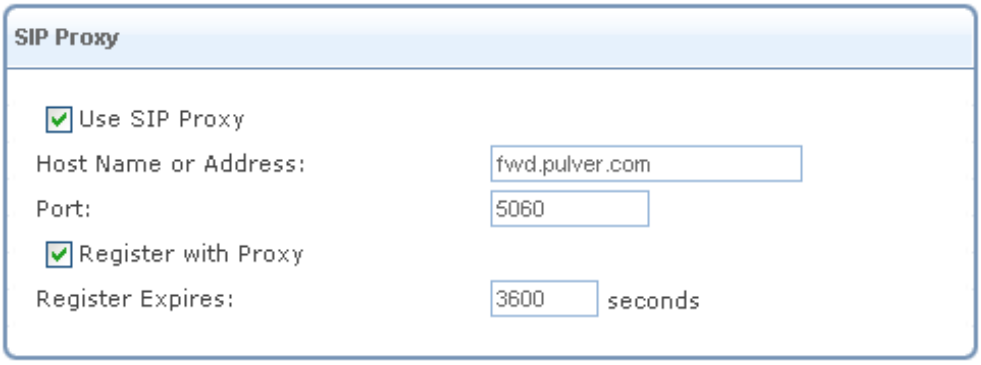


Figure 7.197. SIP Proxy Parameters

Use SIP Proxy Select this check box if your OpenRG uses a SIP proxy. When this item is checked, the following fields appear:

Host Name or Address Specify the proxy's host name or IP address.

Port The port that this proxy is listening on.

Register with Proxy Select this option to register with the proxy, allowing other parties to call OpenRG through it. When this item is checked, the following field becomes visible:

Register Expires The number of seconds between registration renewals.

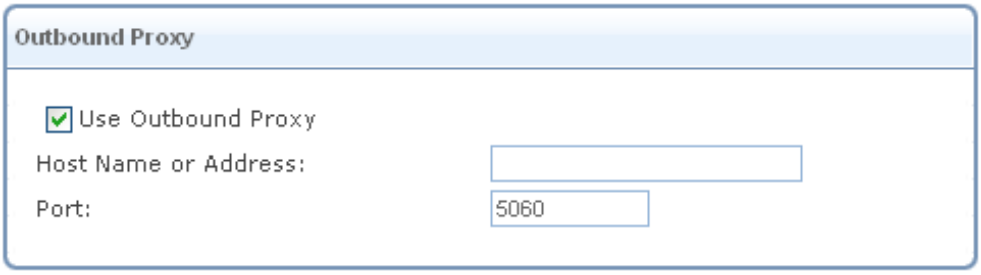


Figure 7.198. Line Parameters -- Outbound Proxy

Use Outbound Proxy Some network service providers require the use of an outbound proxy. This is an additional proxy, through which all outgoing calls are directed. In some cases, the outbound proxy is placed alongside the firewall and is the only way to let SIP traffic pass from the internal network to the Internet. When this item is checked, the following fields become visible:

Host Name or Address The Outbound Proxy's name or IP address.

Port The port that the Outbound Proxy is listening on.

7.6.2.2. Line Parameters (RADVISION)

Click a telephone line's action icon to configure its settings:

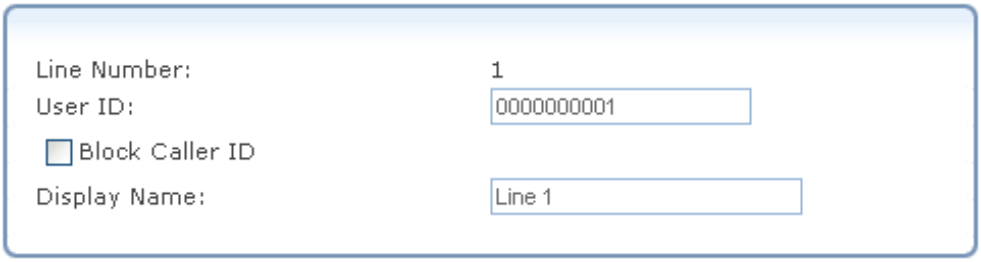


Figure 7.199. General Line Parameters

Line Number A telephone port in OpenRG to which you can connect a standard (POTS) telephone.

User ID This telephone's VoIP user ID, used for identification to initiate and accept calls.

Block Caller ID Select this check box to hide your ID from the remote party.

Display Name A free text description which will be displayed to remote parties as your caller ID.

7.6.2.3. Line Parameters (Asterisk)

Click a telephone line's action icon to configure its settings:

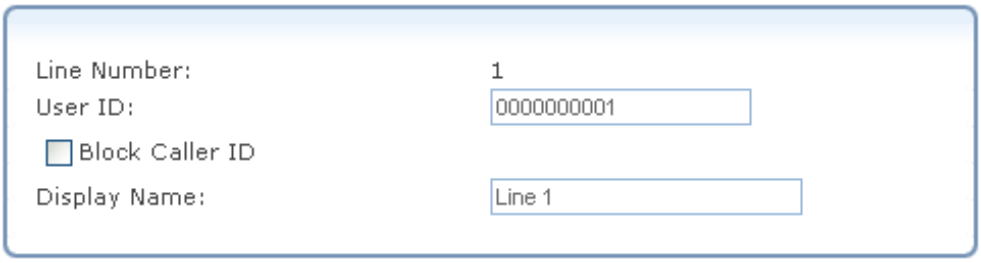


Figure 7.200. General Line Parameters

Line Number A telephone port in OpenRG to which you can connect a standard (POTS) telephone.

User ID This telephone's VoIP user ID, used for identification to initiate and accept calls.

Block Caller ID Select this check box to hide your ID from the remote party.

Display Name A free text description which will be displayed to remote parties as your caller ID.

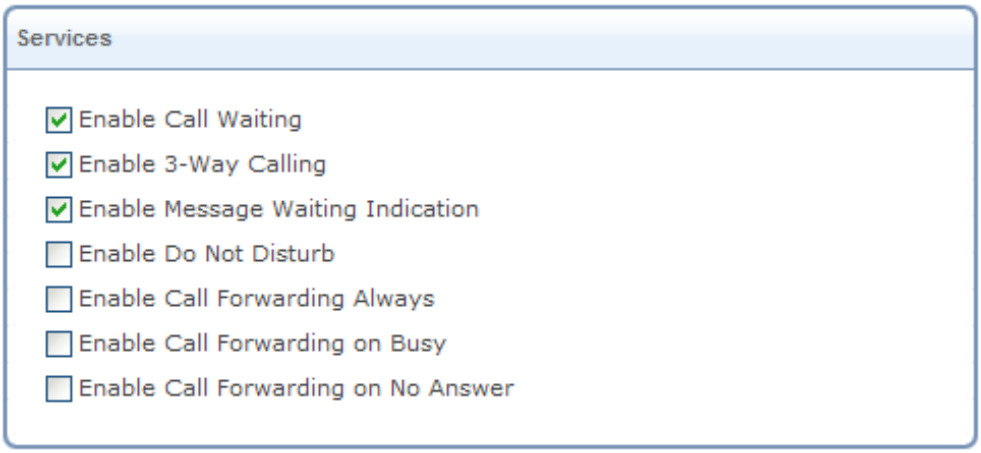


Figure 7.201. Line Parameters -- Services

Enable Call Waiting Select this check box to enable the Call Waiting feature.

Enable 3-Way Calling Select this check box to allow all forms of three-way conversations. When this option is disabled you will not be able to place a call on hold, transfer a call or engage in a call conference.

Enable Do Not Disturb Select this check box to prevent calls from reaching your line. The caller will hear a busy tone. This feature can also be enabled or disabled by dialing *78 or *79 respectively.

Enable Call Forwarding Always Select this check box to forward incoming calls to another telephone number. The screen refreshes, displaying a field for entering the alternate number.

Figure 7.202. Enable Call Forwarding Always

Enable Call Forwarding on Busy Select this check box to forward incoming calls to another telephone number when the line is busy. The screen refreshes, displaying a field for entering the alternate number.

Figure 7.203. Enable Call Forwarding on Busy

Enable Call Forwarding on No Answer Select this check box to forward incoming calls to another telephone number if the call is not answered within a specific timeframe. The screen refreshes, displaying a field for entering the alternate number, and a field for determining the timeframe to ring before the call is forwarded.

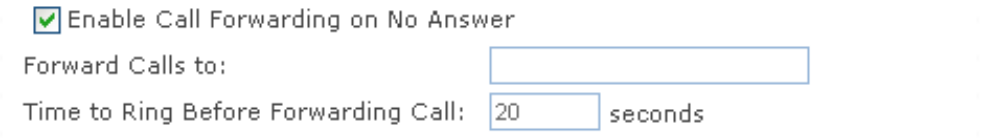


Figure 7.204. Enable Call Forwarding on No Answer

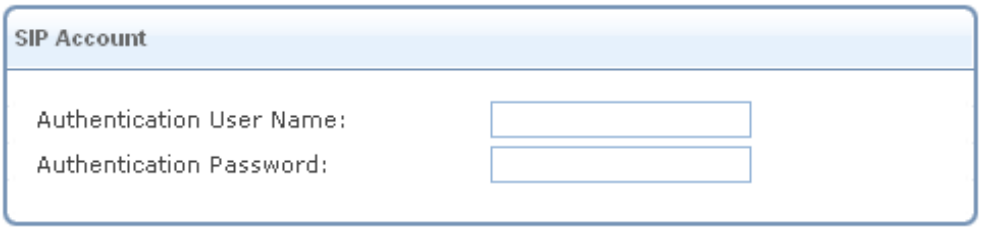


Figure 7.205. Line Parameters -- SIP Account

Authentication User Name The login name used for authentication with the proxy.

Authentication Password The password used for authentication with the proxy.

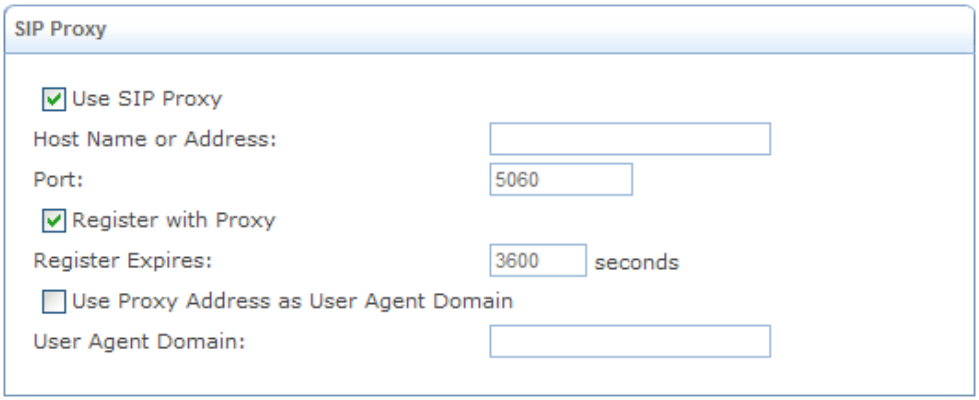


Figure 7.206. Line Parameters -- SIP Proxy

Host Name or Address Specify the proxy's host name or IP address.

Port The port that this proxy is listening on.

Register with Proxy Select this option to register with the proxy, allowing other parties to call OpenRG through it. When this item is checked, the following field becomes visible:

Register Expires The number of seconds between registration renewals.

Use Proxy Address as User Agent Domain Select this option to use the set proxy or its IP address as a domain name specified in the outgoing SIP messages. When this option is unchecked, the 'User Agent Domain' field appears. Use this field for setting another proxy address as a user agent domain.

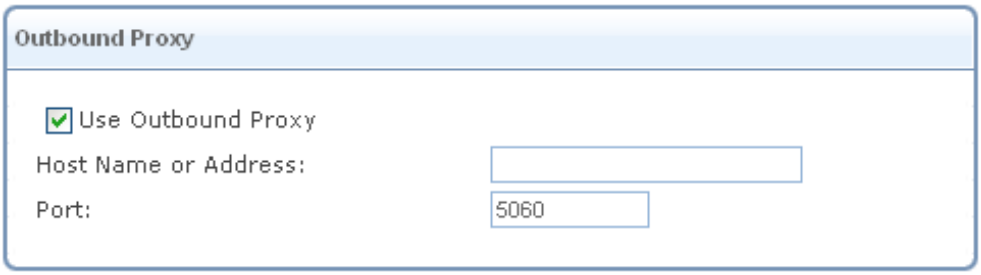


Figure 7.207. Line Parameters -- Outbound Proxy

Use Outbound Proxy Some network service providers require the use of an outbound proxy. This is an additional proxy, through which all outgoing calls are directed. In some cases, the outbound proxy is placed alongside the firewall and is the only way to let SIP traffic pass from the internal network to the Internet. When this item is checked, the following fields become visible:

Host Name or Address The Outbound Proxy's name or IP address.

Port The port that the Outbound Proxy is listening on.

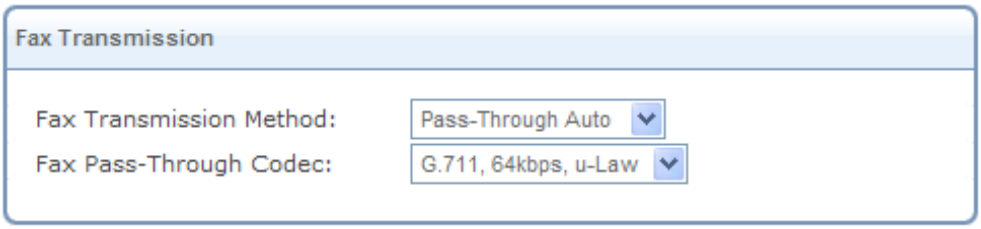


Figure 7.208. Line Parameters -- Fax Transmission

Note: This feature is currently available only on the Broadcom 96358 and Conexant Solos platforms.

Fax Transmission Method The method used by the PBX to switch to a codec that supports transmission of fax messages.

None Selecting this option deactivates this feature. The codec agreed upon by both sides of the conversation (see section Section 7.6.5.5) , which does not necessarily support fax transmission, will not change. Therefore fax trasmission may fail.

T.38 Auto Fax tones will be converted into T.38 packets and then transmitted. This digital mode is the most reliable fax transmission method.

Pass-Through Auto A conversation will begin with the codec agreed upon by both sides. If fax tones become present, the PBX will switch to the codec selected in the next drop-down list, which supports fax transmission.

Pass-Through Force Select this option to ensure that the PBX begins all conversations with the fax supporting codec selected in the next drop-down list.

Fax Pass-Through Codec This option is only visible if a Pass-Through method is selected. Select either the u-Law or A-Law codec supporting fax transmission.

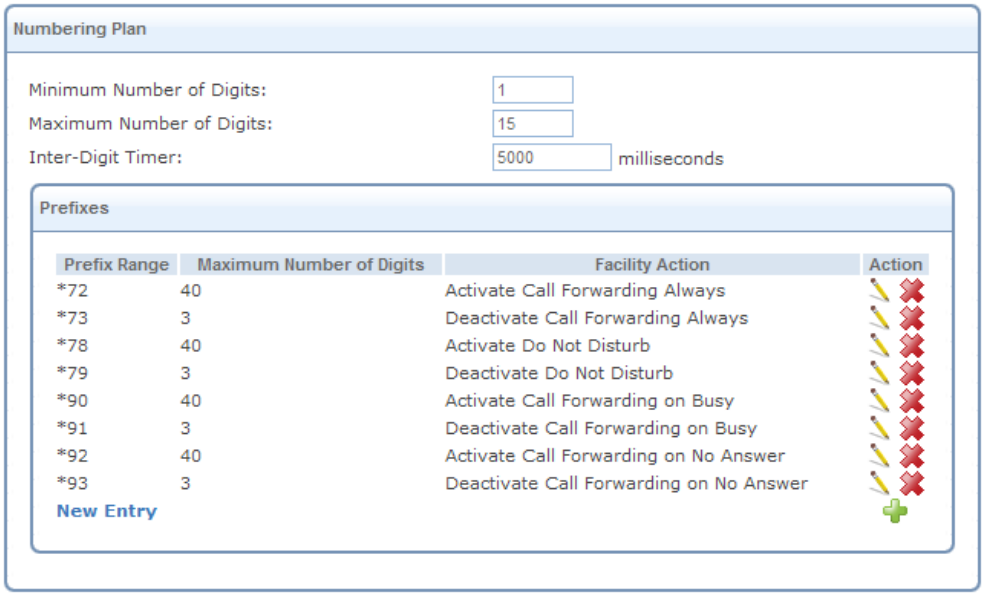


Figure 7.209. Line Parameters -- Numbering Plan

Minimum Number of Digits The minimum number of digits that must be dialed in order for OpenRG to send out the call.

Maximum Number of Digits The maximum number of digits that can be dialed in order for OpenRG to send out the call.

Inter-Digit Timer Specifies the duration (in milliseconds) of allowed inactivity between dialed digits. If the limit is exceeded, the dialing process times out and a warning tone is played. When you work with a proxy or gatekeeper, the number you have dialed before the dialing process has timed out is sent to the proxy/gatekeeper as the user ID to be called. This is useful for calling a remote party without creating a speed dial entry (assuming the remote party is registered with the proxy/gatekeeper).

Prefixes The caller can dynamically activate or deactivate certain actions, using the telephone keypad. For example, activating call forwarding by dialing a prefix and the number to which to forward the call. The Prefixes table displays the configured actions, containing the following parameters.

Prefix Range The digits, or range of digits, constituting the prefix that activates the action. Note that a range is limited to ten digits, as only the last digit can be changed. For example, *72, 1800, 1800-1809, etc.

Maximum Number of Digits The maximum number of digits that can be dialed when activating this action (including the prefix range).

Facility Action The action that will be activated.
You can edit or delete the prefix entries defined in the table, using the action icons. To add a new entry, perform the following:

1. Click the New Entry link. The 'Edit Prefix' screen appears.

Figure 7.210. Edit Prefix

2. Enter a prefix range.

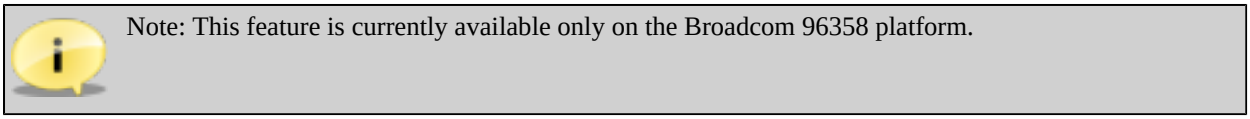
3. Determine the minimum and maximum number of digits to be dialed when activating a rule.

4. Enter the number of digits to remove from the dialed number. This is useful for removing unwanted dialed numbers, such as the digit 9 for external access.

5. Select the facility action to perform. Among activating and deactivating the "Call Forwarding" and "Do Not Disturb" features described earlier, a new "VoIP Call" action is available. Use this action to override the generic numbering plan rules. For example, if you limit callers to dial 3-digit numbers only (by setting the generic maximum number of digits to 3), but would like to enable them to dial 1-800 numbers, enter "1800" as the prefix range, and specify the maximum number of digits that 1-800 numbers may have.

6. Click 'OK' to save the settings.

Figure 7.211. Line Parameters -- PSTN Failover



Enable PSTN Failover Normally, telephones connected to the FXS ports are provided with lines by a SIP service over the Internet. If your board includes an FXO port, you can connect it to your telephone wall outlet (PSTN), through which your phones will operate when the board is turned off. Selecting the "Enable PSTN Failover" option will also switch phones to the FXO port in case Internet connection is lost, ensuring you always have telephone connectivity.

Figure 7.212. Line Parameters -- Advanced SIP Settings

DTMF Transmission Method DTMFs are the tones generated by your telephone's keypad.

Inband The DTMF keypad tones are sent within the voice stream.

Out-of-Band Always (RFC2833) The DTMF keypad tones are represented by the keypad number and are sent as separate packets. This is a more reliable transmission method.

Q.931 Keypad The DTMF keypad tones are sent using Q.931 messages.

H.245 Alphanumeric The DTMF keypad tones are sent using an H.245 alphanumeric Information Element (IE).

H.245 Signal The DTMF keypad tones are sent using an H.245 signal IE.

Out-of-Band by Negotiation (RFC2833) This method allows negotiation with the remote party. DTMF tones will be sent either in-band or out-of-band, depending on the remote party's preference.

SIP INFO A special SIP message that includes the DTMF event description.

Compatibility Mode If you are using Broadsoft as your SIP provider, select its mode from this drop-down list. Otherwise, leave as "Off".

7.6.3. Speed Dial

You can assign speed dial numbers to parties you frequently call. A speed dial entry must specify a destination which may be of one of three types: proxy, local line or direct call.

- Speed Dial via Proxy To add a new proxy speed dial entry:

  1. Click the 'Speed Dial' tab. The 'Speed Dial' screen appears:

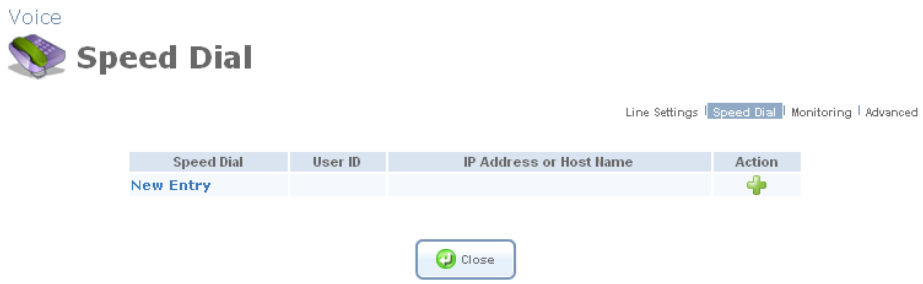


Figure 7.213. Speed Dial

  2. Click the 'New Entry' link to add a new speed dial entry. The 'Speed Dial Settings' screen appears:

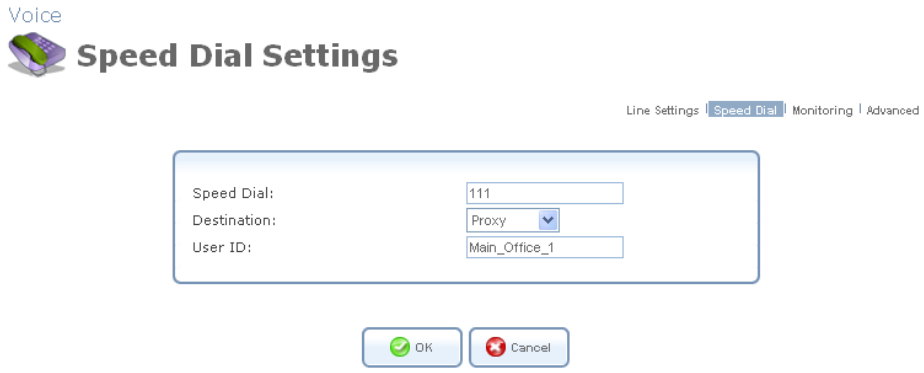


Figure 7.214. Speed Dial - via Proxy

3. Enter the following parameters:
   Speed Dial A shortcut number which you will dial to call this party.

   Destination The entry's destination, in this case a proxy server.

   User ID Specify the remote party's user ID.

4. Click 'OK' to save the settings.

- Speed Dial via Local Line To add a new local line speed dial entry:

1. Click the 'New Entry' link on the 'Speed Dial' tab (see figure Figure 7.213) and select the 'Local Line' option from the combo box. The screen refreshes:

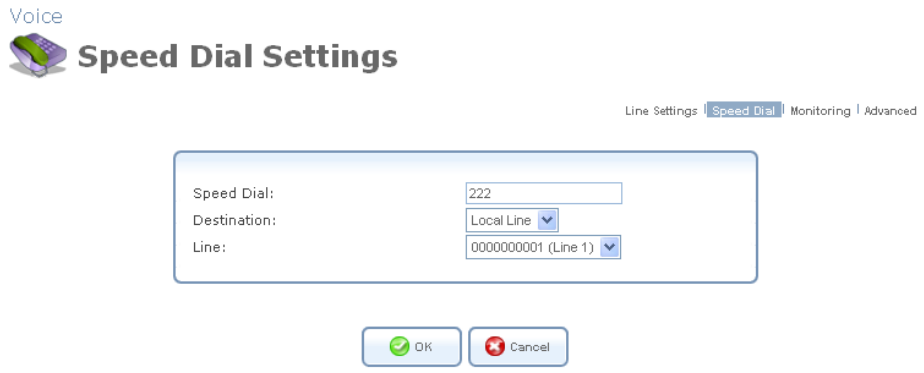


Figure 7.215. Speed Dial - Local Line

2. Enter the following parameters:
   Speed Dial A shortcut number which you will dial to call this party.

   Destination The entry's destination, in this case a local line.

   Line A combo box will display your pre-defined local lines. Select the destination line.

3. Click 'OK' to save the settings.

- Speed Dial via Direct Call To add a new direct call speed dial entry:

1. Click the 'New Entry' link on the 'Speed Dial' tab (see figure Figure 7.213) and select the 'Direct Call' option from the combo box. The screen refreshes:

Figure 7.216. Speed Dial - Direct Call

2. Enter the following parameters:
   Speed Dial A shortcut number which you will dial to call this party.

   Destination The entry's destination, in this case a direct call.

   User ID Specify the remote party's user ID.

   IP Address or Host Name Specify the remote party's IP Address or host name.

3. Click 'OK' to save the settings.

7.6.4. Monitoring

You can monitor the status of your telephone lines in one convenient place--the 'Monitoring' screen. Access this screen by clicking 'Monitoring' under the 'Voice' tab.

Figure 7.217. Telephone Line Monitoring

This screen displays all available lines and information on their statuses in real-time. These statuses include:

Registration Status Indicates whether the line is registered with a telephony service, such as http://www.freeworlddialup.com.

Call State The current state of the line--either idle or in call.
When a call is in progress, additional call statistics appear, such as the number of packets sent/received/lost, interarrival jitter, and more:

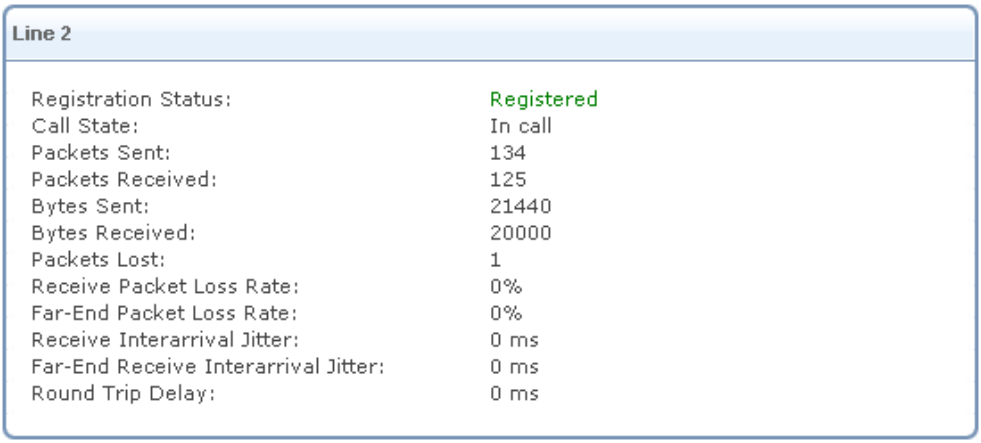


Figure 7.218. Call Statistics

7.6.5. Advanced

The 'Advanced' screen enables configuration of advanced settings. Some of these settings are platform-specific, and therefore may not be available with your gateway's software.

7.6.5.1. Signaling Protocol

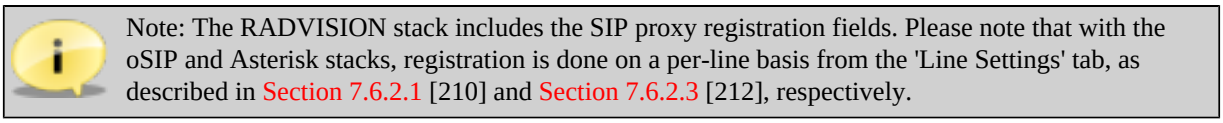
The signaling protocol options available in the drop-down menu, are determined by the VoIP stack on your gateway, as follows:

Stack	**oSIP**	**RADVISION**	**Asterisk**
Available Protocols	SIP	SIP H.323 MGCP	SIP H.323

Table 7.2. VoIP Stacks and Signaling Protocols

A different subset of parameters will become visible with each of the drop-down menu choices. To apply the change of protocol you must press either 'OK' or 'Apply'. If the applied protocol is of another stack, OpenRG will reboot after you accept the reboot warning.

- Session Initiation Protocol (SIP) The SIP signaling protocol is available with all three stacks. The following figure represents the RADVISION stack, which includes all available SIP parameters.



Note: The RADVISION stack includes the SIP proxy registration fields. Please note that with the oSIP and Asterisk stacks, registration is done on a per-line basis from the 'Line Settings' tab, as described in Section 7.6.2.1 [210] and Section 7.6.2.3 [212], respectively.

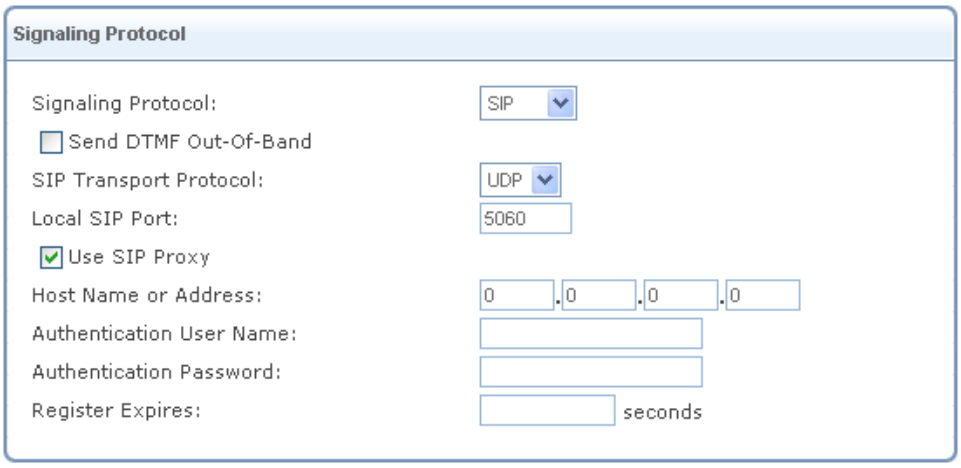


Figure 7.219. Advanced – Signaling Protocol (RADVISION SIP Parameters)

Send DTMF Out-of-Band DTMFs are the tones generated by your telephone's keypad. You should select this check box to ensure reliable transmission of keypad tones.

SIP Transport Protocol The underlying transport protocol to be used for SIP signaling—either TCP or UDP.

Local SIP Port The port on OpenRG that listens to SIP requests from the proxy. By default, port 5060 is used for SIP signaling of phones connected to the gateway. A common problem occurs when using a SIP agent on the LAN (for example, an IP phone). A SIP agent requires port forwarding configuration (refer to Section 7.3.3), which uses the same port—5060. This multiple use of the port causes failure of either or both services. Therefore, when configuring port forwarding for a SIP agent, you must change OpenRG's SIP port value (for example, to 5062). Note that the calling party must be made aware of this value when initiating a direct call (not using a proxy).

Use SIP Proxy Register the user with a SIP proxy, allowing other parties to call the user through the proxy. When this item is checked, the following fields become visible:

Host Name or Address The IP address of the proxy, in dotted number notation.

Authentication User Name The login name used for authentication with this proxy.

Authentication Password The password used for authentication with this proxy.

Register Expires The length of the registration session in seconds before renewal.
The SIP signaling protocol available with the Asterisk stack includes an additional parameter:

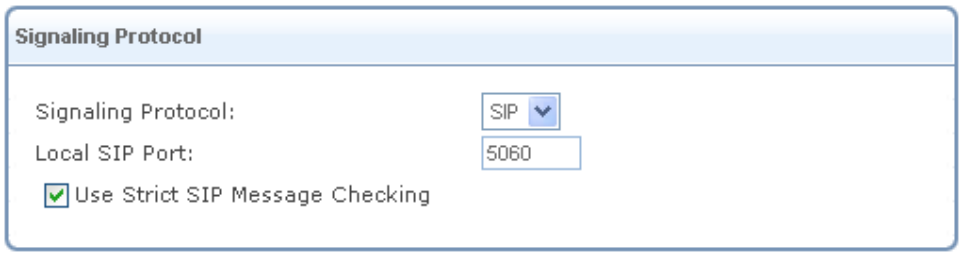


Figure 7.220. Advanced – Signaling Protocol (Asterisk SIP Parameters)

Use Strict SIP Message Checking By default, OpenRG uses strict SIP message checking, which includes checking of tags in headers, international character conversions in URIs, and multiline formatted headers. There are cases in which this option should be disabled to ensure interoperability with certain service providers or third party user agents (SIP endpoints).

- H.323 The H.323 signaling protocol is available with the RADVISION and Asterisk stacks.

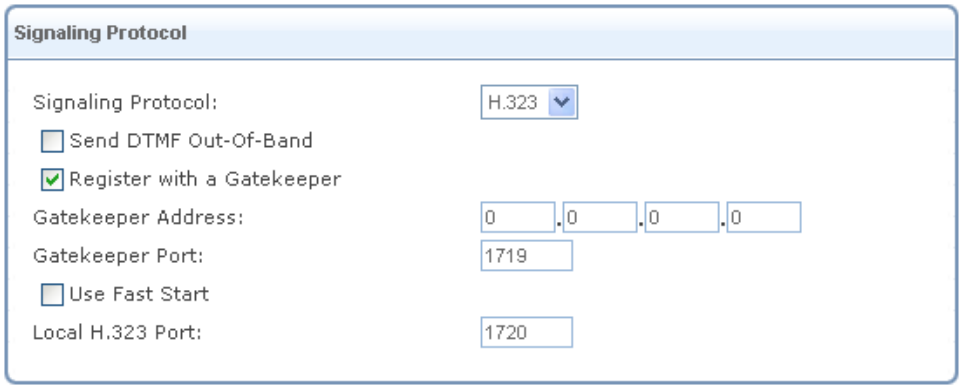


Figure 7.221. Advanced – Signaling Protocol (H.323 Parameters)

Send DTMF Out-of-Band DTMFs are the tones generated by your telephone's keypad. You should select this check box to ensure reliable transmission of keypad tones.

Register with a Gatekeeper Register the user with a gatekeeper, allowing other parties to call the user through the gatekeeper. When this item is checked, the following fields become visible:

Gatekeeper Address The IP address or name of the primary gatekeeper. Note that with RADVISION, this field can only be an IP address in dotted number notation.

Gatekeeper Port The port on which the primary gatekeeper is listening for connections.

Specify Gatekeeper ID Select whether a gatekeeper ID should be used for the primary H.323 gatekeeper.

Gatekeeper ID The identifier for the primary H.323 gatekeeper.

Registration Time to Live Specify the valid duration of the H.323 gatekeeper registration in seconds.

Use Alternate Gatekeeper Select this check-box to configure an alternate gatekeeper for redundancy. When this item is checked, the following fields become visible:

Alternate Gatekeeper Address The IP address or name of the alternate gatekeeper.

Alternate Gatekeeper Port The port on which the alternate gatekeeper is listening for connections.

Use Fast Start The fast start connection method can result in quicker connection establishment, depending on the remote party's settings. Note that Microsoft NetMeeting does not support this option, so in order to interoperate with Microsoft NetMeeting, you should disable the feature.

Use H.245 Tunneling Indicates whether H.245 packets should be encapsulated within H.225 packets.

Local H.323 Port Specify the port number to use for H.323 signaling.
The Asterisk stack features the same H.323 parameters, but provides a DTMF transmission method drop-down menu:

Figure 7.222. Advanced – Signaling Protocol (Asterisk H.323 Parameters)

Inband The DTMF keypad tones are sent within the voice stream.

Out-of-Band Always (RFC2833) The DTMF keypad tones are represented by the keypad number and are sent as separate packets. This is a more reliable transmission method.

Q.931 Keypad The DTMF keypad tones are sent using Q.931 messages.

H.245 Alphanumeric The DTMF keypad tones are sent using an H.245 alphanumeric Information Element (IE).

H.245 Signal The DTMF keypad tones are sent using an H.245 signal IE.
In addition, the Asterisk protocol has several limitations:

- When a gatekeeper is configured, all calls are routed through it. This has the following effect on the speed-dials:

  1. Destination type "Proxy" works normally - the call is sent to the gatekeeper.

  2. Destination type "Local line" - the call will succeed, however it will not be a local call. It will be routed through the gatekeeper, and will go on normally since all of the local lines are registered with this gatekeeper.

  3. Destination type "Direct Call" - speed dials of this type become disabled. This will be indicated in the speed dial table. For direct call speed dials, the "IP Address or Host Name" column will include, in addition to the address, the following red remark: "Disabled in H.323 gatekeeper mode".

- When a gatekeeper is not configured, the only way to make a non-local call is to define a "direct call" speed dial, stating the destination's IP address (or host name). Speed dials of type "Proxy" are meaningless.

- MGCP This signaling protocol is available with the RADVISION stack only.

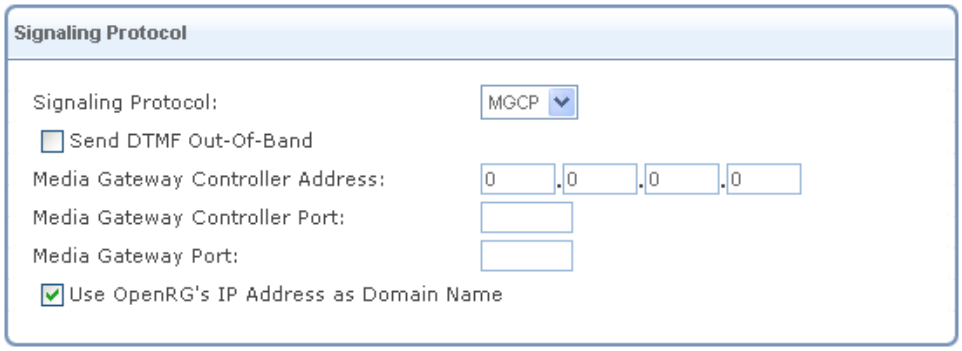


Figure 7.223. Advanced – Signaling Protocol (MGCP Parameters)

Send DTMF Out-of-Band DTMFs are the tones generated by your telephone's keypad. You should select this check box to ensure reliable transmission of keypad tones.

Media Gateway Controller Address The IP address of the MGC (MGCP server), in dotted number notation.

Media Gateway Controller Port The port MGC uses to listen for connections.

Media Gateway Port The port the gateway uses for MGCP connections.

Use OpenRG's IP Address as Domain Name OpenRG's IP address will be used as the domain name for identification. Unselect this check box when provided with a domain name from the MGCP service provider. The screen will refresh, adding the following field.

Media Gateway Domain Name Enter the domain name provided by the MGCP service provider.

7.6.5.2. Services

This 'Services' section appears in the 'Advanced' tab (and not per line, in the 'Line Settings' tab), with the oSIP stack only.

Figure 7.224. Advanced – Services

Enable Call Waiting Select this check box to enable the Call Waiting feature.

7.6.5.3. RTP

Figure 7.225. Advanced – Real Time Protocol

Local RTP Port Range Defines the port range for Real Time Protocol (RTP) voice transport.

7.6.5.4. Quality of Service

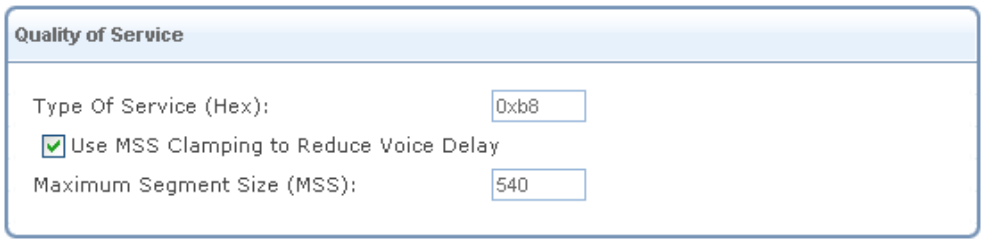


Figure 7.226. Advanced – Quality of Service

Type of Service (HEX) This is a part of the IP header that defines the type of routing service to be used to tag outgoing voice packets originated from OpenRG. It is used to tell routers along the way that this packet should get specific QoS. Leave this value as 0XB8 (default) if you are unfamiliar with the Differentiated Services IP protocol parameter.

Use MSS Clamping to Reduce Voice Delay When using Maximum Segment Size (MSS) Clamping, TCP streams routed via OpenRG when a voice call is active, will have a smaller segment size. This will cause RTP to receive better priority, and will help prevent high voice jitter that is caused by slow upstream transmission rate, which is common with most WAN connections (DSL, DOCSIS, etc.). When checking this option, the 'Maximum Segment Size (MSS)' field will appear, where you can change the maximal segment size.

7.6.5.5. Codecs

Codecs define the method of relaying voice data. Different codecs have different characteristics, such as data compression and voice quality. For example, G.723 is a codec that uses compression, so it is good for use where bandwidth is limited but its voice quality is not as good compared to other codecs such as the G.711.

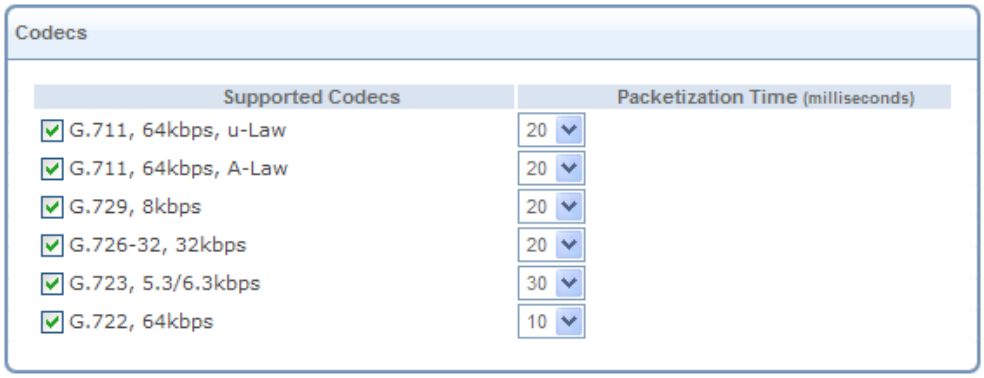


Figure 7.227. Advanced – Codecs

Supported Codecs In order to make a call, at lease one codec must be enabled. Moreover, all codecs may be enabled for best performance. When you start a call to a remote party, your available codecs are compared against the remote party's, to determine which codec will be used. The priority by which the codecs are compared is according to the descending order of their list, depicted in Figure 7.227. If there is no codec that both parties have made available, the call attempt will fail. Note that if more than one codec is common to both parties, you cannot force which of the common codecs that were found will be used by the remote party's client. If you do wish to force the use of a specific codec, leave only that codec checked.

Packetization Time The Packetization Time is the length of the digital voice segment that each packet holds. The default is 20 millisecond packets. Selecting 10 millisecond packets enhances the voice quality, as less information is lost due to packet loss, but doubles the load on the network traffic.

7.6.5.6. Echo Cancellation

This feature is currently available on such platforms as Intel IXP425, Mindspeed Malindi2, Conexant Solos and Broadcom BCM96358, as well as on platforms with the VINETIC chipset.

Echo Cancellation is the elimination of reflected signals ("echoes") made noticeable by delay in the network. This also improves the bandwidth of the line. When the delay of a voice call exceeds acceptable limits, OpenRG will protect the far end from receiving any echo generated at the local end and sent back through the network.

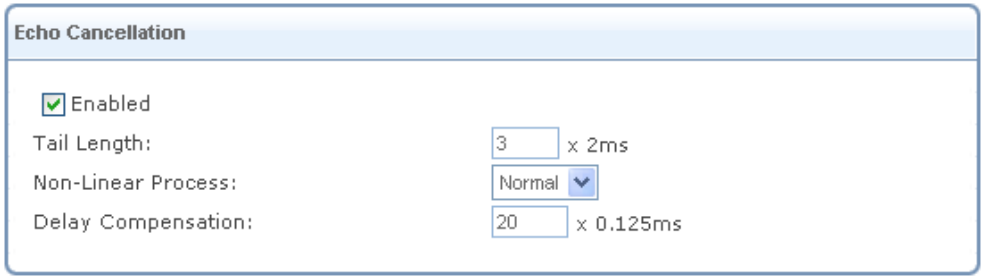


Figure 7.228. Advanced – Echo Cancellation

Note: On some platforms, the feature's graphic interface may differ from the one presented in this figure.

Enabled Check or un-check this box to enable or disable this feature.

Tail Length Defines the length of the elapsed time frame used for calculating the extrapolation of the echo cancellation. A long tail improves the echo cancellation, but increases the load on the Digital Signal Processor (DSP).

Non-Linear Process (NLP) Determines the type of calculation that is used for removing the echo effect. You can set this feature to Normal, High or Off. Using high NLP improves the echo cancellation, but increases the load on the DSP.

Delay Compensation A time delay compensating the echo cancellation.

7.6.5.7. Silence Suppression

The Silence Suppression feature allows optimization to be made when no speech is detected. With this feature enabled, OpenRG is able to detect the absence of audio and conserve bandwidth by preventing the transmission of "silent packets" over the network.

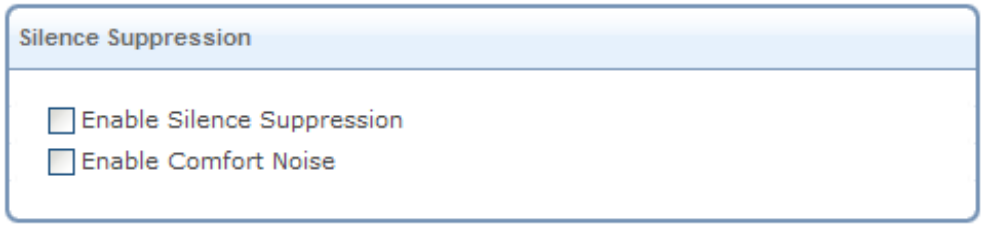


Figure 7.229. Advanced – Silence Suppression

Enable Silence Suppression Check this box to enable this feature.

Enable Comfort Noise Select this option to play a soft "comfort" noise if the other side is performing silence suppression, in order to signal your caller that the conversation is still active.

7.6.5.8. Jitter Buffer

A Jitter Buffer is a shared data area where voice packets can be collected, stored, and sent to the voice processor in evenly spaced intervals. Variations in packet arrival time, called "jitter", can occur because of network congestion, timing drift, or route changes. The jitter buffer intentionally delays the arriving packets so that the end user experiences a clear connection with very little sound distortion.

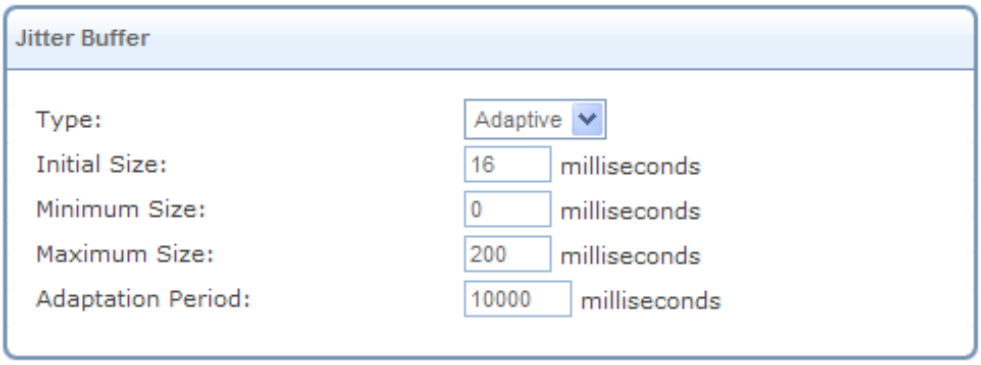


Figure 7.230. Advanced – Jitter Buffer

Type The type of the jitter buffer. Can be either adaptive or fixed. In case of adaptive jitter buffer, the following fields are visible:

Adapt According to Determines whether the jitter buffer size depends on the packet length or on the estimated network jitter.

Scaling Factor The size of the jitter buffer is Scaling Factor multiplied by packet length or by estimated network jitter (depending on the value of the previous field).

Local Adaptation The jitter buffer modifies its size during silence gaps. This way the change in delay is not noticed by the listener. This parameter determines when to perform this adaptation. The options are:

Off Regard as silence packets only those packets that the far end has marked as such.

On Regard as silence packets both the packets that the far end detected, and the packets that were locally detected as speech gaps.

On with sample interpolation No silence is needed. The adaptation is performed gradually through interpolation, so the listener does not notice the jitter buffer change in size. Notice that for this mode, modem or fax transmission could be distorted. This feature should only be used in the case of voice transmission.

Initial Size The initial size of the jitter buffer (in milliseconds).

Maximum Size The maximum size of the jitter buffer (in milliseconds).

Minimum Size The minimum size of the jitter buffer (in milliseconds).

7.6.5.9. FXS Ports

This section contains advanced electronic settings for the FXS (analog) ports, which should only be modified by an experienced administrator or technician.

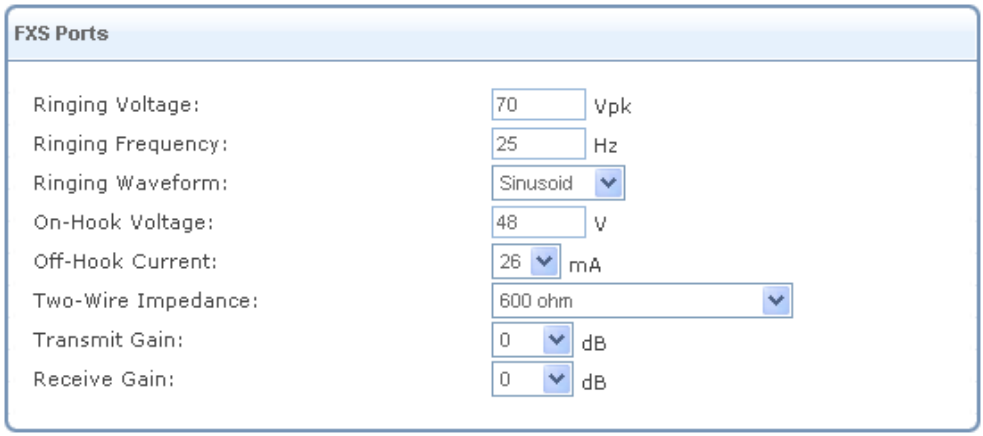


Figure 7.231. Advanced – FXS Ports

Ringing Voltage The ringing voltage in volts.

Ringing Frequency The ringing frequency in hertz.

Ringing Waveform The ringing waveform – sinusoid or trapezoid.

On-Hook Voltage The voltage of an idle handset in volts.

Off-Hook Current Limit The current of an active handset in milli-amperes.

Two-Wire Impedance Select the voice band impedance in ohms, synthesized by the SLIC.

Transmit Gain The transmit gain in decibels.

Receive Gain The receive gain in decibels.

7.6.6. Telephone Operation

Phones connected to OpenRG can place calls, put calls on hold, transfer calls and manage 3-way conferences. In addition, you can quickly place calls using speed dial. The following describes how to perform these operations.

7.6.6.1. Telephone Operation (oSIP)

- Placing a Call
  1. Pick up the handset on the phone.
  2. Dial the remote party's number followed by '#', or a pre-configured speed dial.
- Answering a Waiting Call When the Call Waiting feature is enabled, you may receive a call while engaged in another call. When such call arrives, you will hear a call waiting tone.
  1. To answer a waiting call, press 'Flash' and then dial '1'.
  2. To return to the original call, press 'Flash' and then dial '1'.
  3. This same sequence ('Flash' and '1') may be used to switch back and forth between calls.
- Call Hold To place the remote party on hold, do the following:
  1. Press 'Flash' on the phone.

2. Dial '1'.
3. The phone will sound a dial-tone. At this point you can initiate a second call by dialing another party's number.
4. To return to the original call, press 'Flash' and then dial '1'.
5. This same sequence ('Flash' and '1') may be used to switch back and forth between calls.

- Blind Transfer To transfer an existing call (B) to a third party (C) without consultation, do the following:
  1. Press 'Flash' and then dial '2'. Party B will now be placed on hold, and you will hear a dial tone.
  2. Dial party C's number followed by '#', or a pre-configured speed dial.
  3. The transfer is now complete - you will hear a reorder tone, B is now initiating a call to C.
- Call Transfer With Consultation To transfer an existing call (B) to a third party (C), do the following:
  1. Press 'Flash' on the phone.
  2. Dial '1'. Party B will now be placed on hold, and you will hear a dial tone.
  3. Dial party C's number followed by '#', or a pre-configured speed dial (you can engage in conversation).
  4. To complete the transfer, place the phone's handset on-hook.
- 3-Way Conference To extend an existing call (B) into a 3-way conference by bringing in an additional party (C), do the following:
  1. Press 'Flash' on the phone.
  2. Dial '1'. Party B will now be placed on hold and you will hear a dial tone.
  3. Dial party C's number followed by '#', or a pre-configured speed dial (you can engage in conversation).
  4. Press 'Flash' and then dial '33' to join both C and B to a single conference.

7.6.6.2. Telephone Operation (RADVISION)

- Placing a Call
  1. Pick up the handset on the phone.
  2. Dial the remote party's number or pre-configured speed dial number.
- Call Hold To place the remote party on hold, do the following:
  1. Press 'Flash' on the phone.
  2. Dial '1'.
  3. The phone will sound a dial-tone. At this point you can initiate a second call by dialing another party's number.

  To cancel the hold state and resume the previous phone call, press 'Flash'.
- Call Transfer With Consultation To transfer an existing call (B) to a third party (C), do the following:

1. Press 'Flash' on the phone.
2. Dial '2'. Party B will now be placed on hold, and you will hear a dial tone.
3. Dial party C's number (you can engage in conversation).
4. Press 'Flash' to complete the transfer - you will hear a warning tone, B and C are now talking to each other.

- 3-Way Conference To extend an existing call (B) into a 3-way conference by bringing in an additional party (C), do the following:
  1. Press 'Flash' on the phone.
  2. Dial '33'. Party B will now be placed on hold and you will hear a dial tone.
  3. Dial party C's number (you can engage in conversation).
  4. Press 'Flash' to join both C and B to a single conference.

7.6.6.3. Telephone Operation (Asterisk)

- Placing a Call
  1. Pick up the handset on the phone.
  2. Dial the remote party's number or a pre-configured speed dial followed by '#'.
- Answering a Waiting Call When the Call Waiting feature is enabled, you may receive a call while engaged in another call. When such call arrives, you will hear a call waiting tone.
  1. To answer a waiting call, press 'Flash'.
  2. 'Flash' may be used to switch back and forth between calls.
- Blind Transfer To transfer an existing call (B) to a third party (C) without consultation, do the following:
  1. Press 'Flash'. Party B will now be placed on hold, and you will hear a dial tone.
  2. Dial *98. You should hear three short beeps followed by a dial tone.
  3. Dial party C's number. You should hear a high toned beep followed by two low toned beeps, followed by a dial tone. B is now initiating a call to C. You may now dial a new call or hang up the phone.
- Call Transfer with Consultation To transfer an existing call (B) to a third party (C), do the following:
  1. Press 'Flash' on the phone. Party B will now be placed on hold, and you will hear a dial tone.
  2. Dial party C's number or a pre-configured speed dial followed by '#', (you can engage in conversation).
  3. To complete the transfer, place the phone's handset on-hook.
- 3-Way Conference To extend an existing call (B) into a 3-way conference by bringing in an additional party (C), do the following:
  1. Press 'Flash' on the phone. Party B will now be placed on hold and you will hear a dial tone.
  2. Dial party C's number or a pre-configured speed dial followed by '#', (you can engage in conversation).
  3. Press 'Flash' to join both C and B to a single conference.

4. When you place the phone's handset on-hook, party B and party C will remain in conversation.

7.6.7. Connecting OpenRG's VoIP to a World-Wide SIP Server

OpenRG's telephony system can connect to a remote Session Initiation Protocol (SIP) server in order to conduct world-wide phone calls. The following section describes the configurations of OpenRG and a SIP server, required for conducting world-wide phone calls. Please verify that your gateway and telephone are properly connected and that your WAN connection is up (see section Section 7.6.1). Please note that the following instructions are valid when OpenRG is at its default settings. In order to restore OpenRG's factory defaults, click the 'Advanced' icon on the side-bar and then click the 'Restore Defaults' icon. Note that all of your changes will be lost.

7.6.7.1. Opening a SIP Account

Before you can connect to a SIP server, it is necessary that you obtain a SIP account. The following section describes how to open a free world-wide dialing SIP account. You can also obtain a paid SIP account.

Note: Free accounts limit placing calls to 1-800 numbers and other free account holders only, while paid services offer access to any number.

To open a "Free World Dialup" ("FWD") SIP account:

- Browse to http://www.pulver.com/fwd .
- Press the 'Get FWD!' button on the top-right. You do not need to purchase a phone nor download any software.
- Click the 'Sign Up' link in Step 1 and open an account.

In both cases, you should get instructions by e-mail containing your ID and password, and a SIP IP address. If your gateway's Digital Signal Processing (DSP) module supports the Distinctive Ring service (available on some SIP servers), you can enrich your telephone line functionality by:

- Creating additional numbers for your line, and assigning a distinctive ring pattern to each of them. This is useful, for example, if you want to distinguish between incoming calls intended for you, and those intended for other members of the family.
- Assigning a distinctive ring pattern to the incoming calls, by matching the caller ID to a specific ring tone. By doing so, you can recognize the caller's identity before answering the call.

Note: The availability of the service implementations depends on the SIP service provider.

To activate the Distinctive Ring service, you must first create a SIP account on a server that supports this feature. Examples of such SIP servers are Broadsoft (http://www.broadsoft.com) and Broadvoice (http://www.broadvoice.com). After registering and configuring your SIP account, enter the SIP account settings and the proxy parameters in OpenRG's 'Line Settings' screen, as described in section Section 7.6.7.4 .

7.6.7.2. Configuring Telephone Lines (oSIP)

After creating a SIP account and obtaining the necessary details, configure OpenRG as follows:

1. Click the 'Voice' tab under the 'Services' screen. The 'Line Settings' screen appears (see figure Figure 7.194).
2. Click the action icon of an available line to configure its parameters:

Figure 7.232. SIP Line Settings

1. Enter your newly obtained ID in the 'User ID' field, enter a display name, and whether to block the caller ID for this line.
2. Enter your newly obtained username in the 'Authentication User Name' field.
3. Enter your newly obtained password in the 'Authentication Password' field.
4. Check the 'Use SIP Proxy' check box. The following fields become visible.

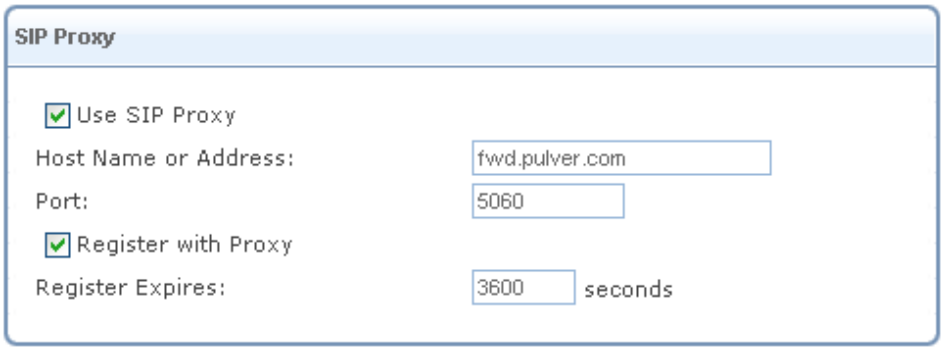


Figure 7.233. SIP Proxy Parameters

1. Enter the IP address or host name you received when registering your SIP account in the 'Host Name or Address' field. Your free account's host name should be fwd.pulver.com (this may vary; you should check your registration e-mail).
2. Verify that the SIP Proxy's 'Port' field is set to 5060.

3. Verify that the 'Register with Proxy' check box is checked.

4. Verify that the 'Register Expires' field is set to 3600.

5. Check the 'Use Outbound Proxy' check box. The free world-wide dialing service is an example of a service provider that requires the use of an outbound proxy. Once checked, the following fields become visible.

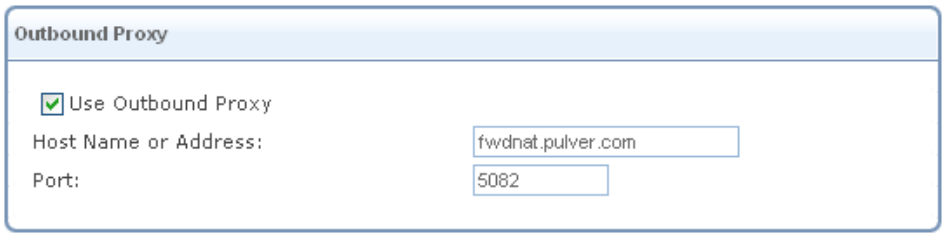


Figure 7.234. Outbound Proxy

1. Enter the outbound proxy's IP address or host name that you received when registering your SIP account in the 'Host Name or Address' field. Your free account's outbound proxy's name should be fwdnat.pulver.com (this may vary; you should check your registration e-mail).

2. Set the outbound proxy's 'Port' field to 5082 (this may also vary).

6. Click 'OK' to save the settings.

7. Select the 'Advanced' tab.

1. Verify that the 'Phone Number Size' field is set to 15 digits.

2. Verify that the 'Signalling Protocol' is set to 'SIP'.

3. Verify that the 'SIP Port' field is set to '5060'.

8. Click 'OK' to save the settings.

After a few seconds you will get a ring tone on the telephone connected to your gateway. You can now dial to any number that your SIP account will allow.

7.6.7.3. Configuring Telephone Lines (RADVISION)

After creating a SIP account and obtaining the necessary details, configure OpenRG as follows:

1. Click the 'Voice' tab under the 'Services' screen. The 'Line Settings' screen appears (see figure Figure 7.194).

2. Click the action icon of an available line to configure its parameters:

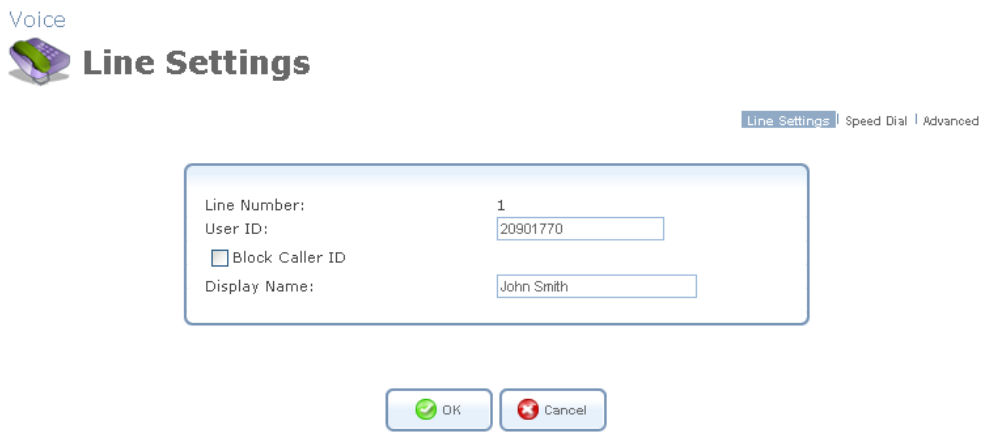


Figure 7.235. SIP Line Settings

1. Enter your newly obtained ID in the 'User ID' field, enter a display name, and whether to block the caller ID for this line, and click 'OK'.

2. Select the 'Advanced' tab.

    1. Verify that the 'Phone Number Size' field is set to 15 digits.

    2. Verify that the 'VoIP Signalling Protocol' is set to 'SIP'.

    3. Verify that the 'SIP Port' field is set to '5060'.

    4. Check the 'Use SIP Proxy' check box. The following fields become visible.

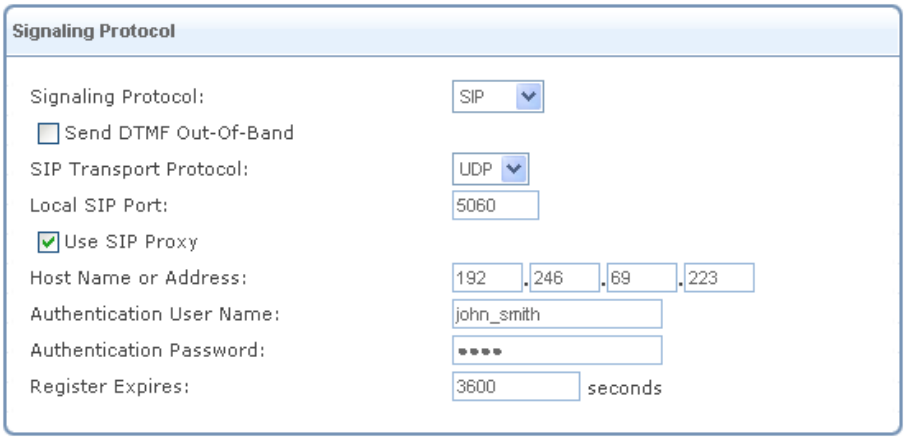

Signaling Protocol
Signaling Protocol: SIP
Send DTMF Out-Of-Band
SIP Transport Protocol: UDP
Local SIP Port: 5060
Use SIP Proxy
Host Name or Address: 192 . 246 . 69 . 223
Authentication User Name: john_smith
Authentication Password: ••••
Register Expires: 3600 seconds

Figure 7.236. SIP Proxy Parameters

    5. Enter the IP address you received when registering your SIP account in the 'SIP Proxy Address' field. Your free account's address should be 192.246.69.223 (this may vary; you should check your registration e-mail).

    6. Enter your newly obtained username in the 'Authentication User Name' field.

    7. Enter your newly obtained password in the 'Authentication Password' field.

3. Click 'OK' to save the settings.

After a few seconds you will get a ring tone on the telephone connected to your gateway. You can now dial to any number that your SIP account will allow.

7.6.7.4. Configuring Telephone Lines (Asterisk)

After creating a SIP account and obtaining the necessary details, configure OpenRG as follows:

1. Click the 'Voice' tab under the 'Services' screen. The 'Line Settings' screen appears (see figure Figure 7.194).
2. Click the action icon of an available line to configure its parameters:

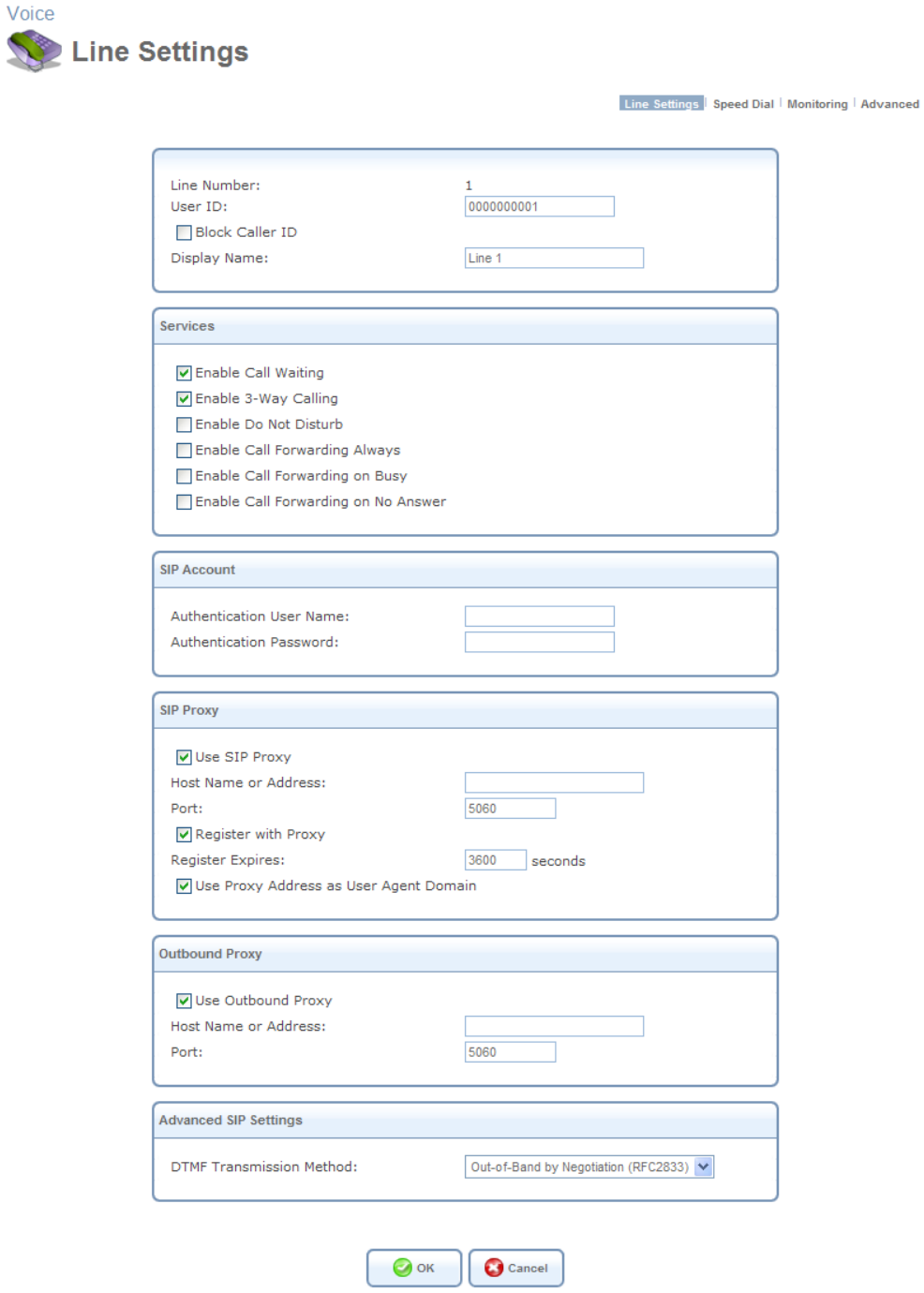


Figure 7.237. SIP Line Settings

1. Enter your newly obtained ID in the 'User ID' field, enter a display name, and whether to block the caller ID for this line.
2. Optionally, select the check boxes in the 'Services' section to enable the corresponding call-related features.

3. Enter your newly obtained username in the 'Authentication User Name' field.

4. Enter your newly obtained password in the 'Authentication Password' field.

5. Check the 'Use SIP Proxy' check box. The following fields become visible.

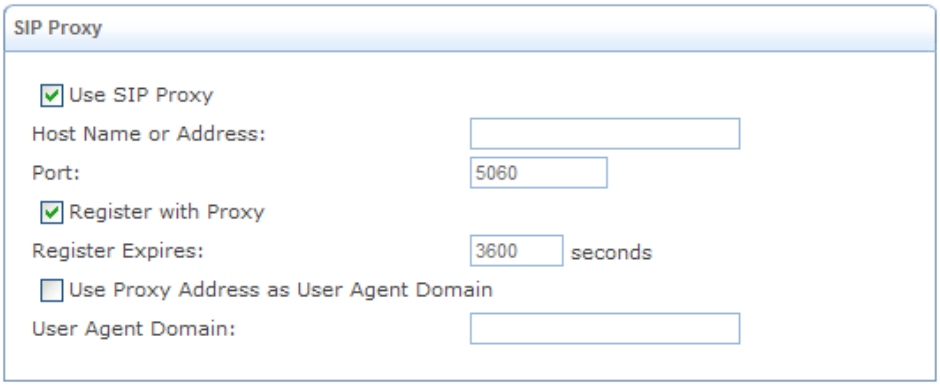


Figure 7.238. SIP Proxy Parameters

1. Enter the IP address or host name you received when registering your SIP account in the 'Host Name or Address' field. Your free account's host name should be fwd.pulver.com (this may vary; you should check your registration e-mail).

2. Verify that the SIP Proxy's 'Port' field is set to 5060.

3. Verify that the 'Register with Proxy' check box is checked.

4. Verify that the 'Register Expires' field is set to 3600.

5. Verify that the 'Use Proxy Address as User Agent Domain' check box is selected, unless you want to use another proxy as the user agent domain.

6. Check the 'Use Outbound Proxy' check box. The free world-wide dialing service is an example of a service provider that requires the use of an outbound proxy. Once checked, the following fields become visible.

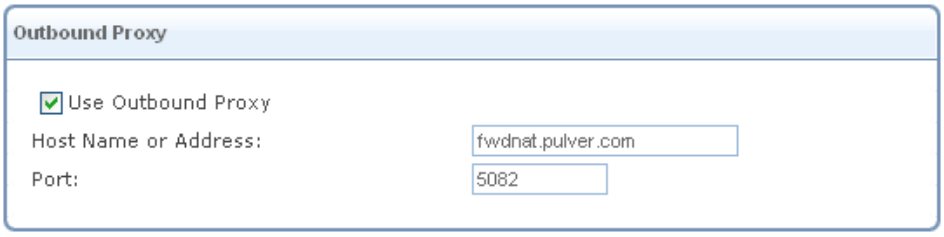


Figure 7.239. Outbound Proxy

1. Enter the outbound proxy's IP address or host name that you received when registering your SIP account in the 'Host Name or Address' field. Your free account's outbound proxy's name should be fwdnat.pulver.com (this may vary; you should check your registration e-mail).

2. Set the outbound proxy's 'Port' field to 5082 (this may also vary).

7. Select the telephone line's DTMF transmission method from the DTMF options combo box.

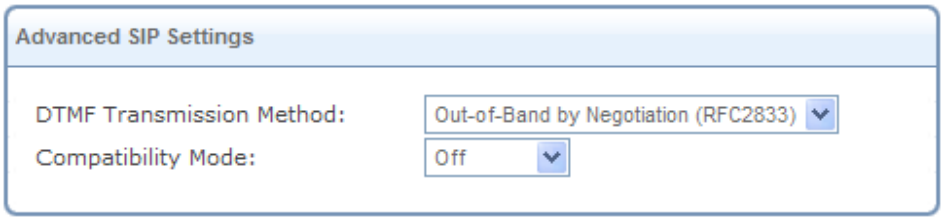


Figure 7.240. Line Parameters -- Advanced SIP Settings

8. Click 'OK' to save the settings.

After a few seconds you will get a ring tone on the telephone connected to your gateway. You can now dial to any number that your SIP account will allow.

7.7. IP Private Branch Exchange

OpenRG's Private Branch Exchange (PBX) solution provides a private telephone switching system that allows telephone extensions to connect to each other as well as to the outside world.
In most cases, a PBX is an independent piece of equipment residing in an enterprise, responsible for switching calls between enterprise users. It allows these end users to place calls using a network instead of standard telephony infrastructure. Your gateway includes such a PBX, enabling users to share a specific number of external phone lines, saving the added cost of having an external phone line for each user. OpenRG's PBX allows end users to place calls using a network instead of standard telephony infrastructure.

OpenRG's PBX manages both Plain Old Telephone Service (POTS) and Voice over IP (VoIP) devices, utilizing VoIP accounts to connect them to telephony proxies. Devices within OpenRG's PBX can freely communicate with each other, thus creating a cost-effective telephony environment.

7.7.1. Physical Setup

Note: In order for all of OpenRG's PBX features to function properly, a partitioned storage device, formatted with EXT2/3 (recommended) or FAT32, must be available on your gateway. Such a device can be a USB disk-on-key or hard drive. Also note that when restoring defaults, all PBX-related data will be deleted from this storage device. This data includes voice mail messages and greetings, auto-attendant greetings and music on-hold files.

1. Verify that OpenRG is connected to the WAN as the gateway.
2. Connect a telephone to the gateway in any of the following methods:
    1. Connect a standard Plain Old Telephone Service (POTS) telephone to one of the available telephone ports on the gateway.
    2. Connect a POTS telephone to a LAN port on the gateway, using an Analog Telephone Adaptor (ATA) unit.
    3. Connect an IP telephone to a LAN port on the gateway.

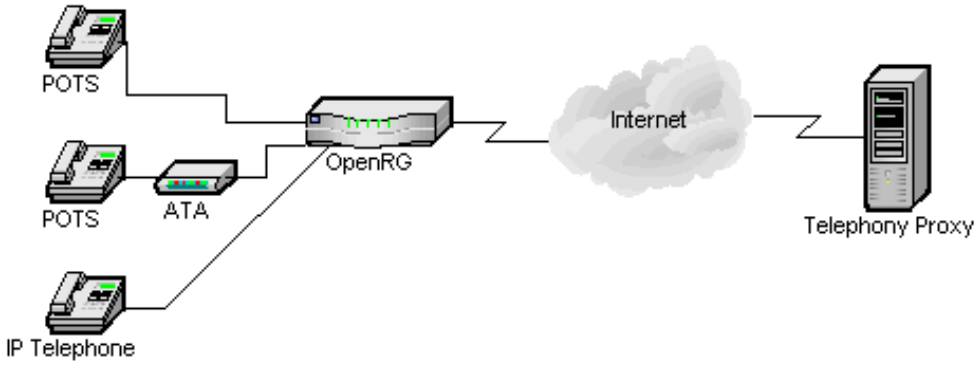


Figure 7.241. Telephony Physical Setup

Click the 'IP-PBX' tab under 'Services'. The main PBX screen appears, displaying the various tabs used to configure your gateway's telephone exchange system (see figure Figure 7.242).

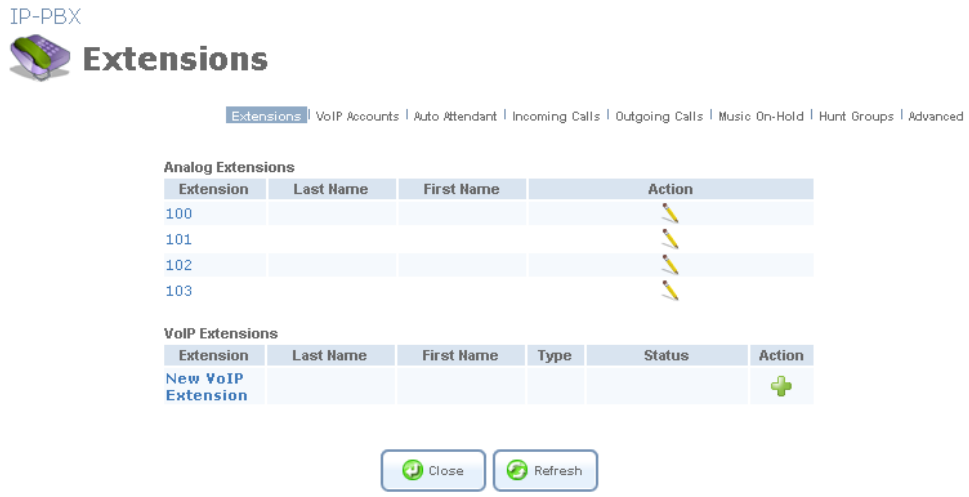

IP-PBX
Extensions
Extensions | VoIP Accounts | Auto Attendant | Incoming Calls | Outgoing Calls | Music On-Hold | Hunt Groups | Advanced
Analog Extensions
Extension | Last Name | First Name | Action
100
101
102
103
VoIP Extensions
Extension | Last Name | First Name | Type | Status | Action
New VoIP Extension
Close
Refresh

Figure 7.242. PBX Main Screen

7.7.2. Extensions

The 'Extensions' screen (see figure Figure 7.242) is divided into two main sections, Analog Extensions and VoIP Extensions.

7.7.2.1. Analog Extensions

This section displays the settings of OpenRG's four physical telephone ports (see figure Figure 7.243), for which OpenRG serves as an Analog Telephone Adaptor (ATA) device.

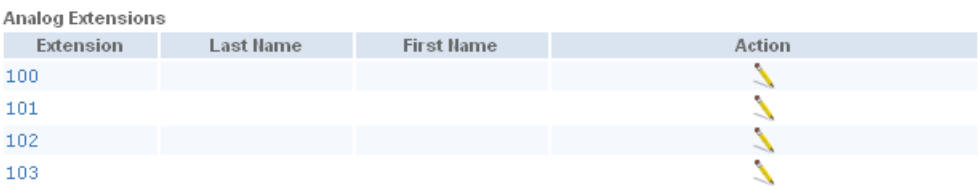


Figure 7.243. Analog Extensions

The ports' default extensions (100--103), as well as other settings, can be edited by clicking the extension's number or action icon . The 'Edit Extension' screen appears.

Figure 7.244. Edit Extension

This screen enables you to configure the following parameters:

Extension Number Specify the extension number.

Last Name, First Name Specify a full name to the extension.

Enable Call Waiting Select this check box to enable the Call Waiting feature.

Enable 3-Way Calling Select this check box to allow all forms of three-way conversations. When this option is disabled you will not be able to place a call on hold, transfer a call or engage in a call conference.

Enable Do Not Disturb Select this check box to prevent calls from reaching your extension. The caller will be forwarded to your voice mail. This feature can also be enabled or disabled by dialing *78 or *79 respectively.

Enable Voice Mail Enable the voice mail feature. To learn how to use this feature, please refer to section Section 7.7.2.3.

7.7.2.2. VoIP Extensions

This section displays OpenRG's unlimited number of VoIP extensions. VoIP devices connected to the gateway's LAN must be configured with 192.168.1.1 and an extension number. This number, as well as other settings, should be entered in this section (see figure Figure 7.245).

Figure 7.245. VoIP Extensions

To add a VoIP extension, click the 'New VoIP Extension' link. The 'Edit Extension' screen appears.

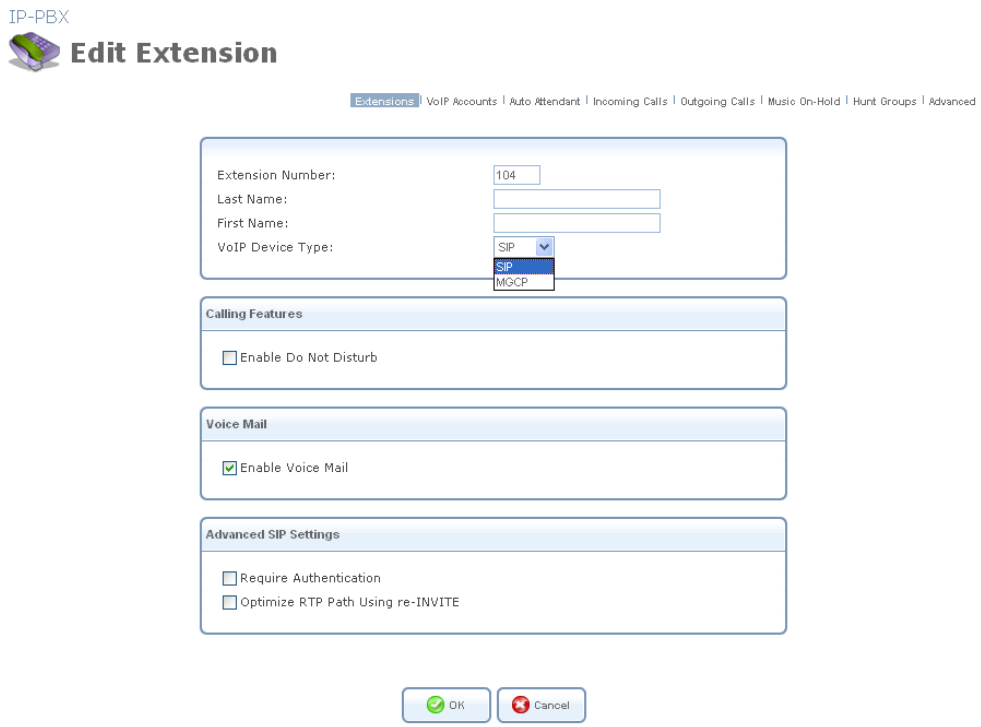


Figure 7.246. Edit Extension -- SIP

This screen enables you to configure the following parameters, regardless of the VoIP device type:

Extension Number Specify the extension number, as pre-configured in the device's settings.

Last Name, First Name Specify a full name to the extension.

Enable Do Not Disturb Select this check-box to prevent calls from reaching your extension. The caller will be forwarded to your voice mail. This feature can also be enabled or disabled by dialing *78 or *79 respectively.

Enable Voice Mail Enable the voice mail feature. To learn how to use this feature, please refer to section Section 7.7.2.3.
In addition, this screen enables you to select your device type, SIP or MGCP, and configure it accordingly.

7.7.2.2.1. SIP VoIP Device Extensions

By default, the 'VoIP Device Type' combo box is set to SIP, enabling you to configure an extension for a SIP VoIP device. Configure the following parameters in the 'SIP Settings' section:

Require Authentication Select this check-box to secure your telephony network. By default, SIP devices register with OpenRG as their proxy (you must configure the device's proxy field with OpenRG's IP address), by identifying themselves with extension numbers, pre-configured on both the devices and on OpenRG. When selecting the 'Require Authentication' option, OpenRG will not accept mere extension number identification, but will require additional authentication data, in the form of a user name and password. This protects your telephony network from, for example, a malicious wireless intruder disguising himself as one of your office extensions, and making free phone calls at your expense. When this option is selected, the screen refreshes, providing username and password fields.

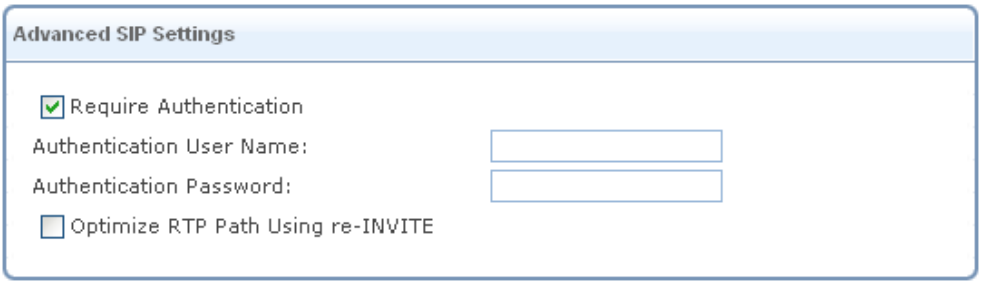


Figure 7.247. SIP Settings

Authentication User Name The user name used for SIP device authentication. Note that this user name must first be configured on the SIP device.

Authentication Password The password used for SIP device authentication. Note that this password must first be configured on the SIP device.

Optimize RTP Path Using re-INVITE Select this option if you would like OpenRG to attempt letting the telephony LAN device and the SIP proxy exchange Real Time Protocol (RTP) traffic (the audio stream) directly, which is more efficient. Please note that in order for this feature to work, it must also be enabled for the VoIP account through which the call is routed (see section Optimize RTP Path Using re-INVITE).

7.7.2.2.2. MGCP VoIP Device Extensions

Select the MGCP option in the 'VoIP Device Type' combo box. The screen refreshes.

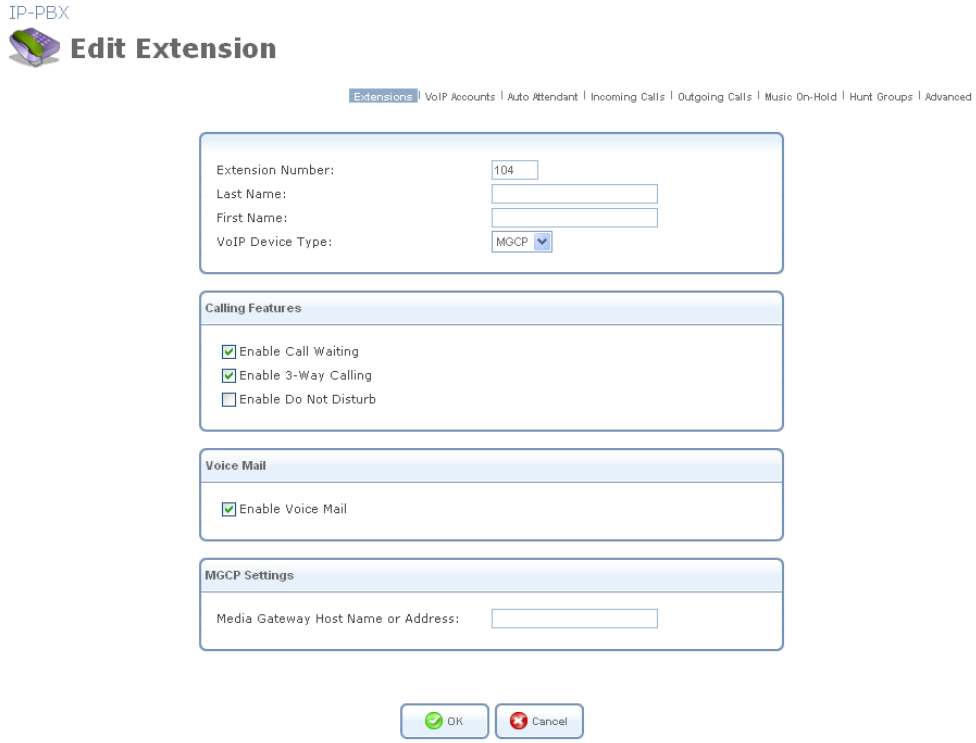


Figure 7.248. Edit Extension -- MGCP

Configure the following parameters:

Enable Call Waiting Select this check box to enable the Call Waiting feature.

Enable 3-Way Calling Select this check box to allow all forms of three-way conversations. When this option is disabled you will not be able to place a call on hold, transfer a call or engage in a call conference.

Media Gateway Host Name or Address Specify the telephony device's name or IP address. If the device is connected to OpenRG's LAN, it is recommended to override its dynamic IP address assignment, by pre-configuring it with a static IP address outside OpenRG's range of dynamically-assigned IP addresses. This will avoid its address from changing (in which case you would have to re-enter the new address in this field.)

In addition to OpenRG's configuration, the telephony device must be configured with OpenRG's IP address (192.168.1.1), in the media gateway controller field. If the device's user ID is configurable, verify that it is set to "aaln/1".

7.7.2.3. Using the Voice Mail

The voice mail feature is an interactive attendant application, enabling you to listen to your messages and configure various voice mail options.

7.7.2.3.1. Accessing the Voice Mail

To access the voice mail application from any extension, pick up the handset and dial ***1234** . The attendant will ask you for your password. Dial the default password: **0000#** . The PBX will indicate that you have messages in the following methods:

- When picking up the handset, the dial tone will commence with a stutter tone.
- After entering your password, the attendant will inform you whether you have any messages.

7.7.2.3.2. Voice Mail Operations

As soon as you enter the voice mail application, the attendant will prompt you to press different keys for various options. Navigate through these options to perform all voice mail operations. Refer to the list below for all operations and their corresponding keys.

1 New/old messages

4 Play previous message

5 Repeat current message

6 Play next message

7 Delete current message

8 Forward message to another mailbox

9 Save message in a folder

***** Help; during message playback: rewind

Exit; during message playback: fast-forward

2 Change folders

3 Advanced options

1 Send reply

2 Call back

3 Envelope

4 Outgoing call

5 Leave message

***** Return to main menu

0 Mailbox options

1 Record your unavailable message

2 Record your busy message

3 Record your name

4 Change your password

***** Return to the main menu

***** Help

Exit

7.7.3. VoIP Accounts

VoIP accounts are large-bandwidth telephone channels between switching centers that handle many simultaneous voice and data signals. In OpenRG, this term refers to the virtual entities connecting telephony devices to service proxies. Once you have obtained a proxy service account(s), define a VoIP account to create the connection with the proxy. Press the 'VoIP Accounts' tab in the PBX main screen (see figure Figure 7.242). The following screen appears:

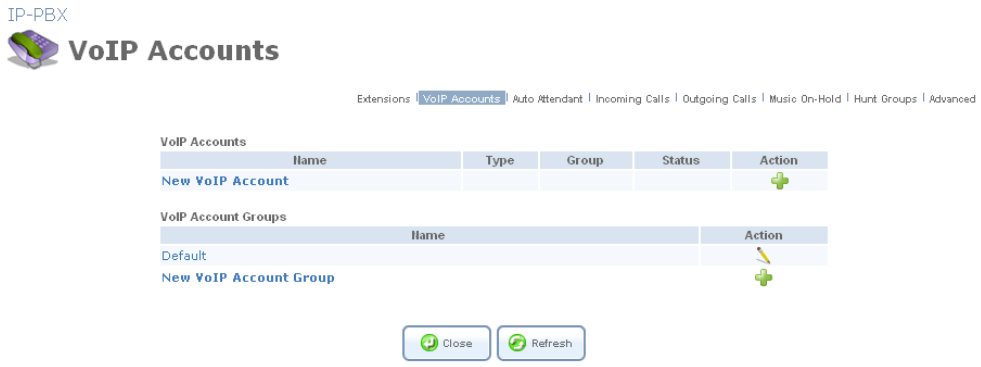


Figure 7.249. VoIP Accounts Tab

In this screen you can define both VoIP accounts and VoIP account groups.

7.7.3.1. Defining VoIP Accounts

To define a VoIP account, click the 'New VoIP Account' link. The 'Edit VoIP Account' screen appears:

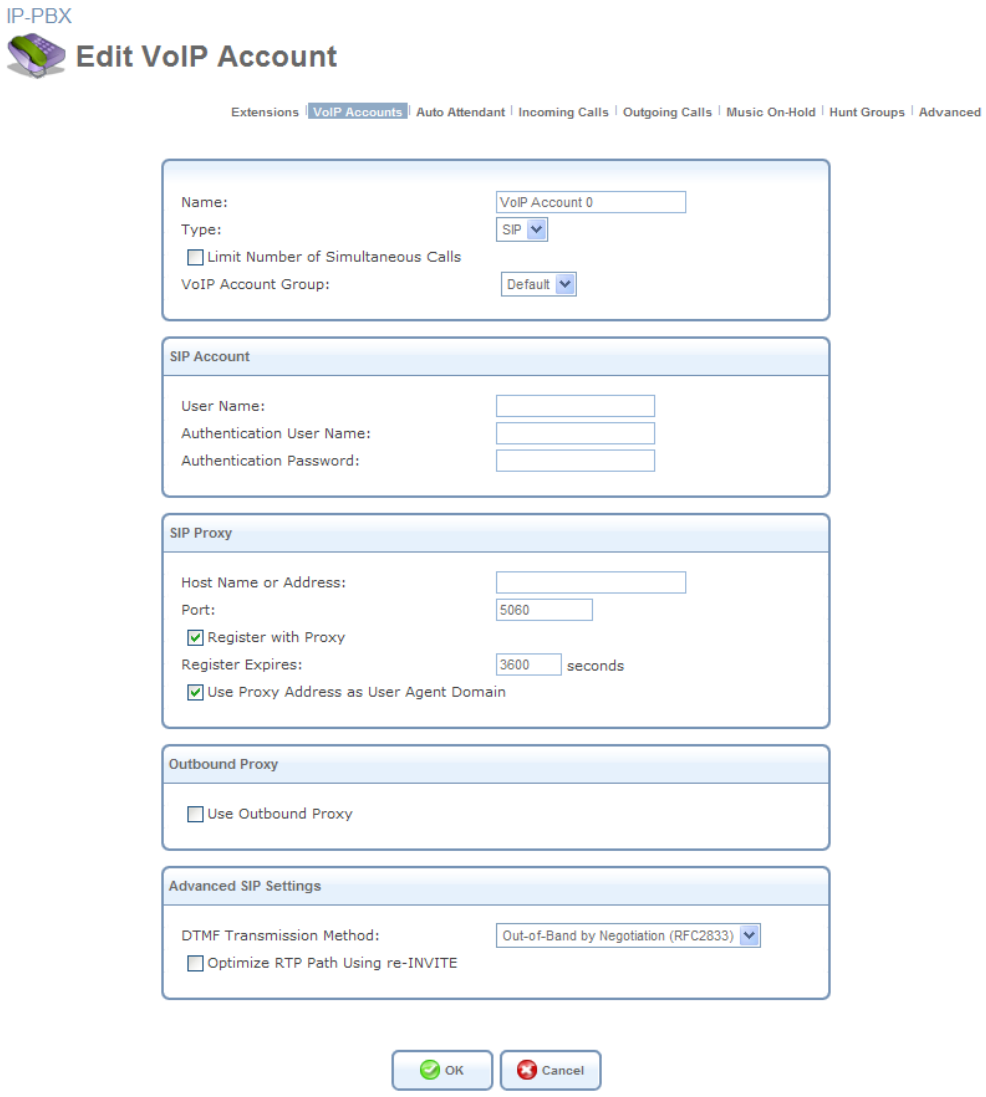


Figure 7.250. Edit VoIP Account

Name The name of the VoIP account.

Type This screen enables you to add or edit two types of VoIP accounts -- SIP or H.323. Their different settings are depicted in the following sections, respectively.

Limit Number of Simultaneous Calls You can control the maximum number of simultaneous calls performed from OpenRG through the VoIP account. This is useful, for example, if your proxy account has a call limit. When selecting this option, the screen will refresh, providing a field for entering the maximum number (see figure Figure 7.251).

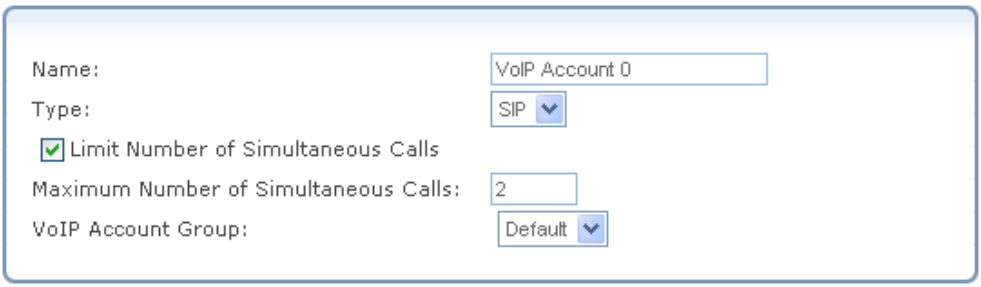


Figure 7.251. Limit Number of Simultaneous Calls

VoIP Account Group The VoIP account group to which this account belongs. When multiple VoIP account groups are defined, use the combo box to select a group to which this VoIP account will belong. To define VoIP account groups, see section Section 7.7.3.2.

7.7.3.1.1. SIP Account

By default, the 'Type' combo box is set to SIP, enabling you to configure a SIP account. Configure the following parameters:

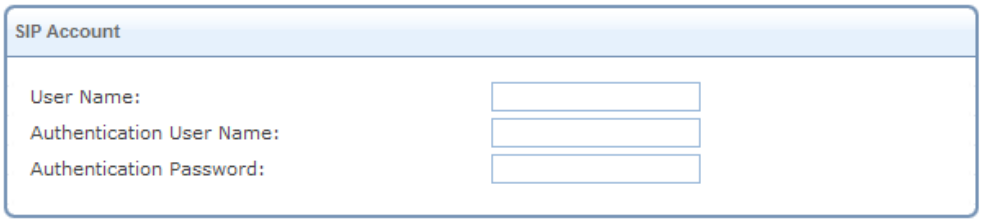


Figure 7.252. SIP Account

User Name Enter your SIP account username.

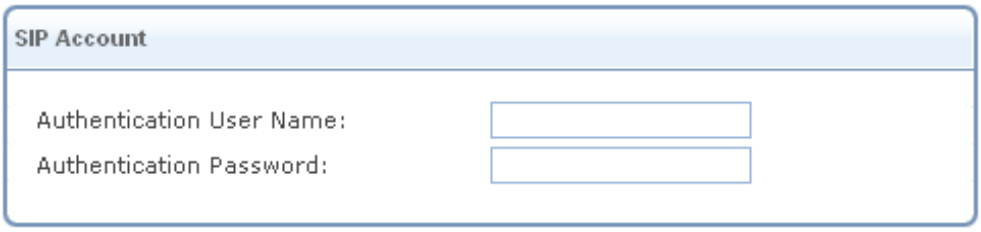


Figure 7.253. Line Parameters -- SIP Account

Authentication User Name The login name used for authentication with the proxy.

Authentication Password The password used for authentication with the proxy.

Host Name or Address Specify the proxy's host name or IP address.

Port The port that this proxy is listening on.

Register with Proxy Select this option to register with the proxy, allowing other parties to call OpenRG through it. When this item is checked, the following field becomes visible:

Register Expires The number of seconds between registration renewals.

Use Proxy Address as User Agent Domain Select this option to use the set proxy or its IP address as a domain name specified in the outgoing SIP messages. When this option is unchecked, the 'User Agent Domain' field appears. Use this field for setting another proxy address as a user agent domain.

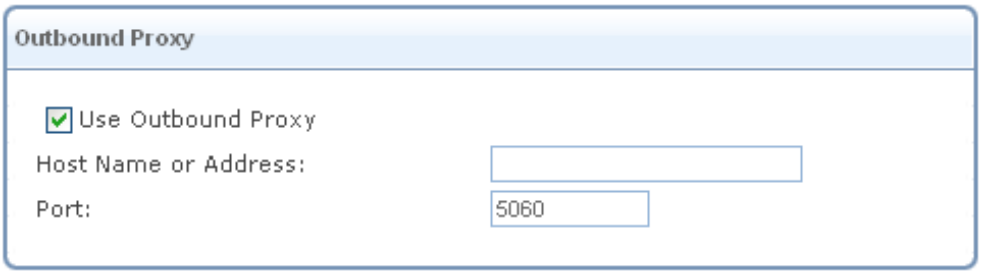


Figure 7.254. Line Parameters -- Outbound Proxy

Use Outbound Proxy Some network service providers require the use of an outbound proxy. This is an additional proxy, through which all outgoing calls are directed. In some cases, the outbound proxy is placed alongside the firewall and is the only way to let SIP traffic pass from the internal network to the Internet. When this item is checked, the following fields become visible:

Host Name or Address The Outbound Proxy's name or IP address.

Port The port that the Outbound Proxy is listening on.

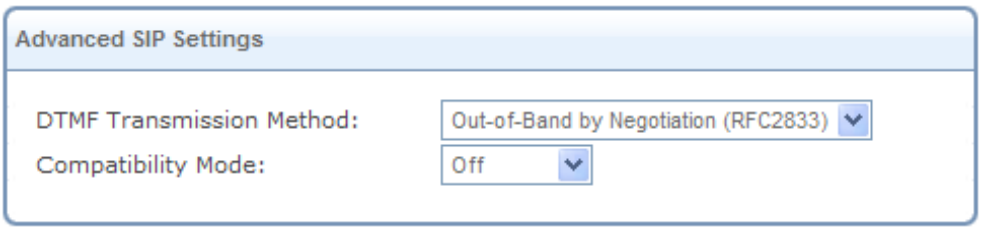


Figure 7.255. Line Parameters -- Advanced SIP Settings

DTMF Transmission Method DTMFs are the tones generated by your telephone's keypad.

Inband The DTMF keypad tones are sent within the voice stream.

Out-of-Band Always (RFC2833) The DTMF keypad tones are represented by the keypad number and are sent as separate packets. This is a more reliable transmission method.

Q.931 Keypad The DTMF keypad tones are sent using Q.931 messages.

H.245 Alphanumeric The DTMF keypad tones are sent using an H.245 alphanumeric Information Element (IE).

H.245 Signal The DTMF keypad tones are sent using an H.245 signal IE.

Out-of-Band by Negotiation (RFC2833) This method allows negotiation with the remote party. DTMF tones will be sent either in-band or out-of-band, depending on the remote party's preference.

SIP INFO A special SIP message that includes the DTMF event description.

Compatibility Mode If you are using Broadsoft as your SIP provider, select its mode from this drop-down list. Otherwise, leave as "Off".

Optimize RTP Path Using re-INVITE Select this option if you would like OpenRG to attempt letting the SIP proxy and a telephony LAN device exchange Real Time Protocol (RTP) traffic (the audio stream) directly, which is more efficient.

7.7.3.1.2. H.323 Account

Select the H.323 option in the 'Type' combo box. The screen will refresh (see figure Figure 7.256).

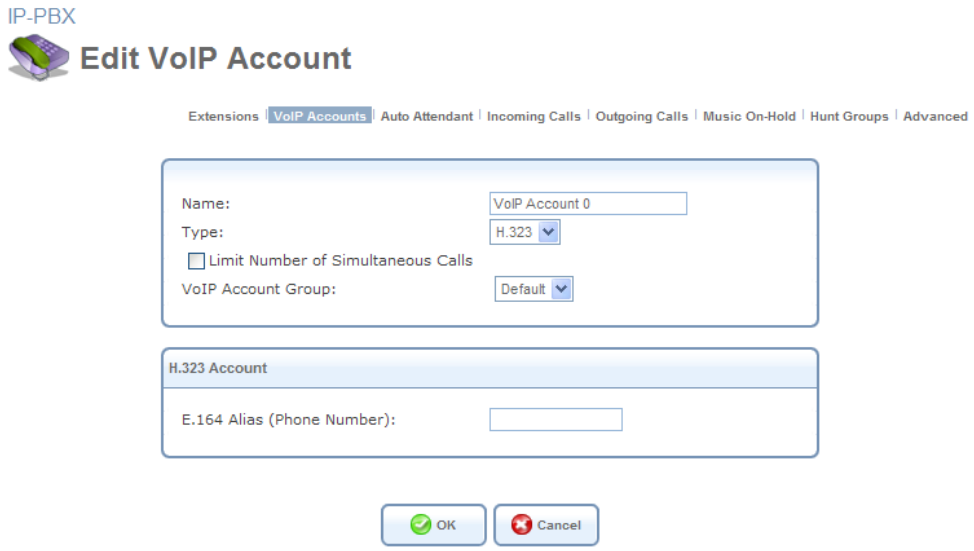


Figure 7.256. Edit VoIP Account

Configure the following parameter:

E.164 Alias (Phone Number) Enter your H.323 account phone number.

7.7.3.2. Defining VoIP Account Groups

By default, the PBX is pre-configured with one editable, non-removable VoIP account group, to which all created accounts will automatically be added. If you would like to group VoIP accounts in different groups, simply define additional VoIP account groups. Click the 'New VoIP Account Group'. The 'Edit VoIP Account Group' screen will appear (see figure Figure 7.257).

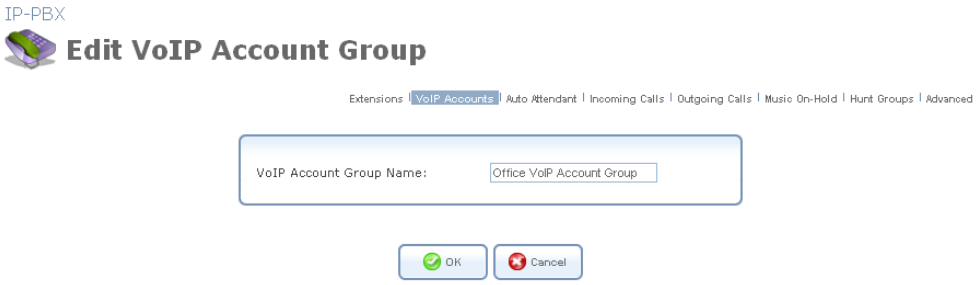

IP-PBX
Edit VoIP Account Group
Extensions | VoIP Accounts | Auto Attendant | Incoming Calls | Outgoing Calls | Music On-Hold | Hunt Groups | Advanced
VoIP Account Group Name:
Office VoIP Account Group
OK
Cancel

Figure 7.257. Edit VoIP Account Group

Enter a name for the new VoIP account group, and click 'OK' to save your settings. New and existing VoIP accounts can now be assigned to each VoIP account group, by selecting the group in the 'Edit VoIP Account' screen (see figure Figure 7.250).

7.7.4. Auto Attendant

OpenRG's PBX includes an auto attendant feature, allowing you to intelligently handle incoming calls, by providing callers the ability to route their calls to relevant parties using the telephone's keypad. You can customize a menu of multiple auto attendants according to your office structure or any other preference. Press the 'Auto Attendant' tab in the PBX main screen (see figure Figure 7.242). The following screen appears:

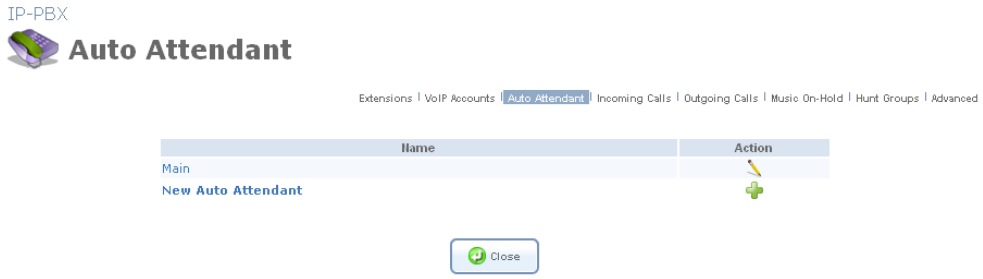


Figure 7.258. Auto Attendant Tab

By default, the PBX is pre-configured with one editable, non-removable auto attendant named 'Main Auto Attendant'. Use the 'New Auto Attendant' link to add additional auto attendants. Click an auto attendant link to view or edit its parameters. The 'Edit Auto Attendant' screen appears.

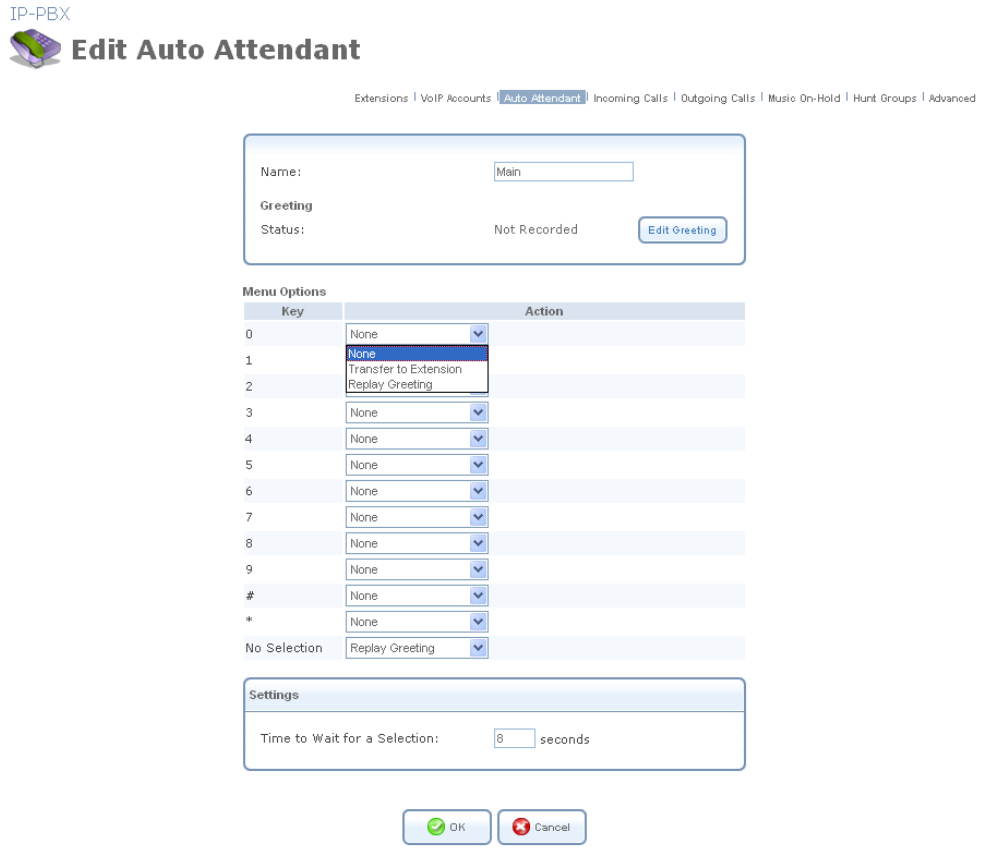


Figure 7.259. Edit Auto Attendant

Name The name of the auto attendant.

Greeting The greeting callers will hear when dialing to OpenRG. In order to use OpenRG's default greeting or record your own, you must first connect an external storage device to your board. To record your preferred message, press the 'Edit Greeting' button. The 'Auto Attendant Greeting' screen appears.

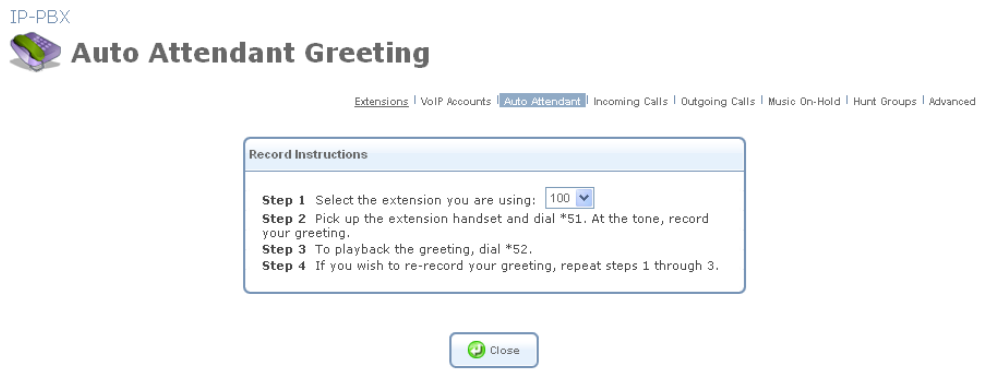

IP-PBX
Auto Attendant Greeting
Extensions | VoIP Accounts | Auto Attendant | Incoming Calls | Outgoing Calls | Music On-Hold | Hunt Groups | Advanced
Record Instructions
Step 1 Select the extension you are using: 100
Step 2 Pick up the extension handset and dial *51. At the tone, record your greeting.
Step 3 To playback the greeting, dial *52.
Step 4 If you wish to re-record your greeting, repeat steps 1 through 3.
Close

Figure 7.260. Auto Attendant Greeting

Follow the instructions in this screen. Note that in **Step 1** you must select the extension through which you are recording the message. *Important:* When done, press the 'Close' button.

Menu Options Use this section to configure an action for each keypad button press. This includes the pound and star keys, as well as an action for when no button is pressed. Please note that at any time, the caller can dial and be routed to any extension number. The actions that can be defined for every keypad button are:

None No action will be performed.

Transfer to Extension Transfer the call to a specific extension. When defining this action, the screen will refresh, displaying a combo box with all currently available extensions (see figure Figure 7.261). Select the extension to which you would like the call to be transferred.

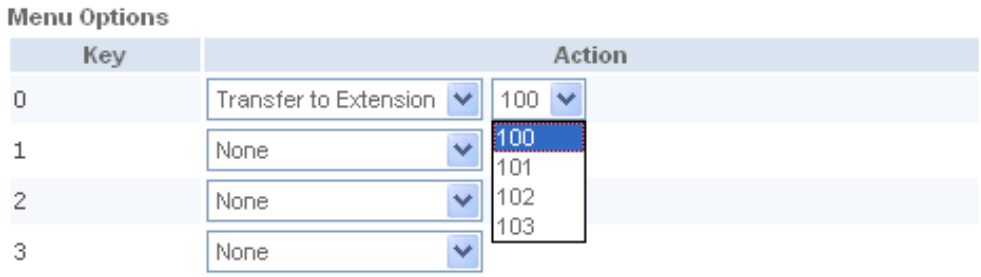


Figure 7.261. Menu Options -- Transfer to Extension

Play Auto Attendant Transfer to a different auto attendant. This action will only be available when more than one attendant exists. Define additional attendants from the 'Auto Attendants' tab screen (see figure Figure 7.258). When defining this action, the screen will refresh, displaying a combo box with all other available auto attendants (see figure Figure 7.262). Select the auto attendant that you would like to be played.

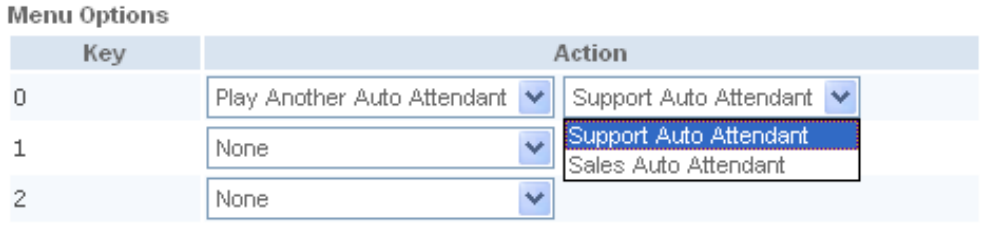


Figure 7.262. Menu Options -- Play Auto Attendant

Replay Greeting The greeting message will be replayed.

Time to Wait for a Selection Specify the timeframe that the system will wait for the caller to select an action. After this timeframe, the action defined in the 'No Selection' menu option will occur.

7.7.5. Incoming Calls

OpenRG can receive calls from telephony proxies that are defined in its VoIP accounts. Such calls will be automatically routed to the PBX through their respective accounts. The PBX features an incoming call handling mechanism, enabling you to control your incoming calls per VoIP account, in both day and night modes. This is useful for handling business hours and off-hours calls differently. Since this feature is configured per VoIP account, you must first define one (see section Section 7.7.3) in order to set its incoming call policy. Press the 'Incoming Calls' tab in the PBX main screen (see figure Figure 7.263). The following screen appears:

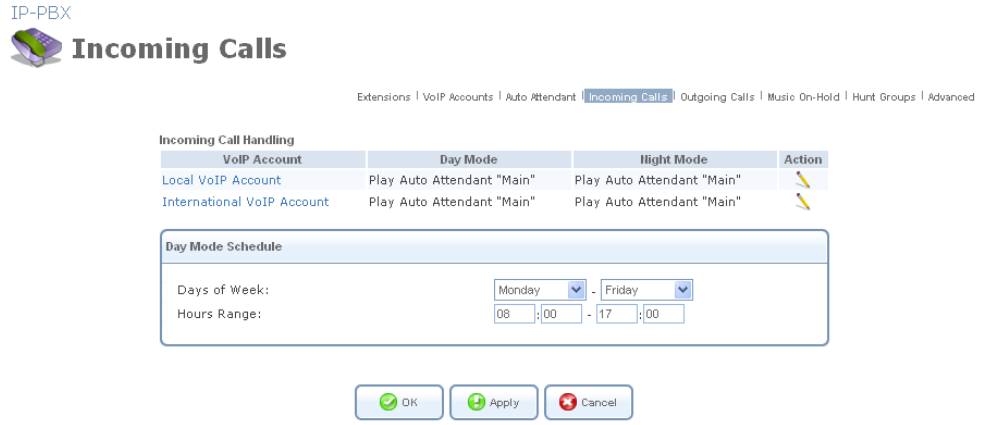


Figure 7.263. Incoming Calls Tab

As you can learn from this screen, by default VoIP accounts are configured to play the 'Main Auto Attendant', both day and night, Monday through Friday. Configuring this feature is consisted of two stages -- defining incoming call handling for day and night modes, and scheduling the day mode (which automatically sets the night mode to the rest of the week cycle).

7.7.5.1. Incoming Call Handling

To configure the way a VoIP account handles incoming calls, click its name (or action icon). The 'Edit Incoming Call Handling' screen appears.

Figure 7.264. Edit Incoming Call Handling

Configure the actions that will occur when a call arrives. The following instructions apply to both day and night modes, which are set in the same manner.

Play Auto Attendant When this option is selected in the first combo box, the second one will display a list of your available auto attendants. Select the auto attendant you would like to be played.

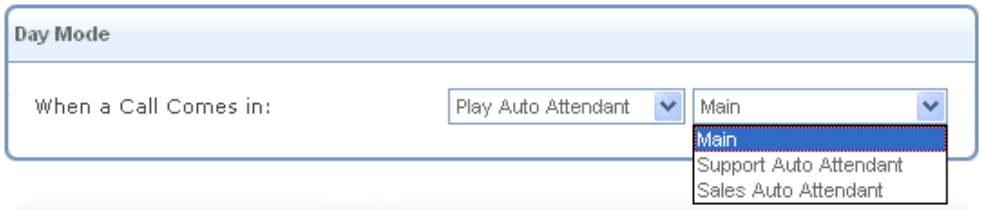


Figure 7.265. Play Auto Attendant

Transfer to Extension When this option is selected, the screen will refresh. The second combo box will now display a list of your available extensions, and an additional check-box will appear. Select the extension to which you would like to route the call.

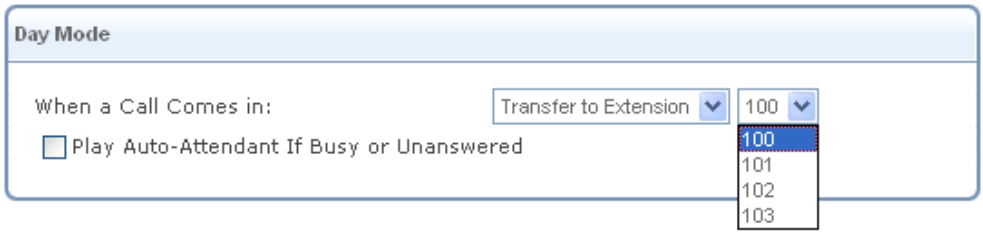


Figure 7.266. Transfer to Extension

Play Auto-Attendant If Busy or Unanswered Select this option if you would like to play an auto attendant in case the extension is busy or if the call is unanswered. The screen will refresh, allowing you to select the auto attendant to be played.

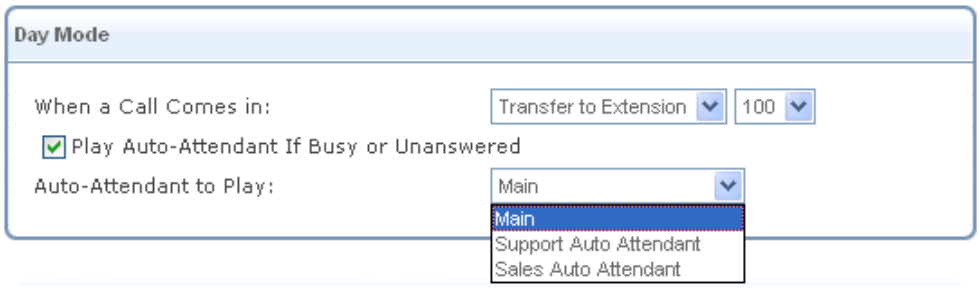


Figure 7.267. Play Auto-Attendant If Busy or Unanswered

7.7.5.2. Day Mode Schedule

This section of the screen enables you to divide a week cycle into two time segments, during which incoming calls can be handled differently. Only one segment must be configured (the "day" mode) -- the rest of the time in the week cycle will be referred to as the second segment (the "night" mode). Determine the day mode time segment:

Days of Week Select from which day through which day will be included in this mode.

Hours Range Enter from what hour to what hour of every day will be included in this mode.

7.7.6. Outgoing Calls

OpenRG's PBX provides a sophisticated mechanism for handling outgoing calls, by utilizing a dial plan. A **Dial Plan** is a set of rules you can determine in order to route outgoing calls through specific VoIP accounts. Each dial plan rule is referred to as a "dial plan entry", which you can add, edit or remove.

7.7.6.1. Reaching an External Line

Press the 'Outgoing Calls' tab in the PBX main screen (see figure Figure 7.268). The following screen appears:

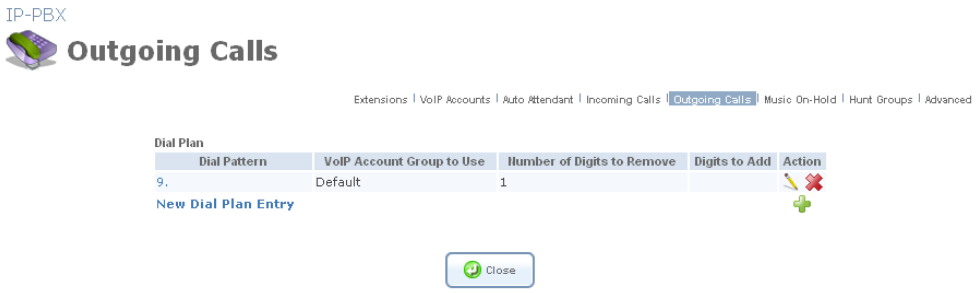


Figure 7.268. Outgoing Calls Tab

As you can learn from this screen, the dial plan contains a default entry, which provides the option to press "9" for an external line. To view the entry's settings, click its action icon . The 'Edit Dial Plan Entry' screen appears.

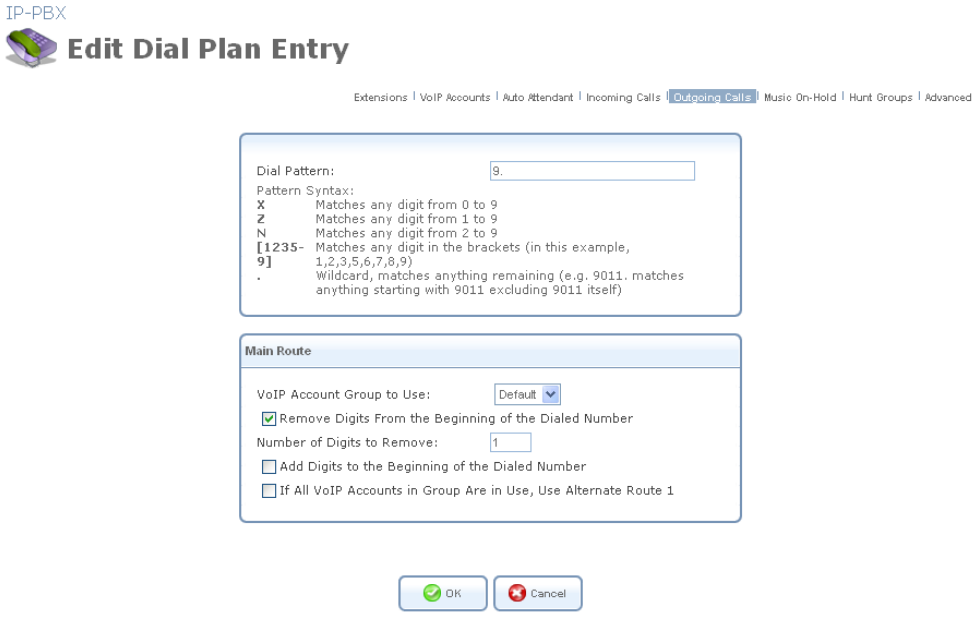

IP-PBX
Edit Dial Plan Entry
Extensions | VoIP Accounts | Auto Attendant | Incoming Calls | Outgoing Calls | Music On-Hold | Hunt Groups | Advanced
Dial Pattern:
9.
Pattern Syntax:
X Matches any digit from 0 to 9
Z Matches any digit from 1 to 9
N Matches any digit from 2 to 9
[1235-9] Matches any digit in the brackets (in this example, 1,2,3,5,6,7,8,9)
. Wildcard, matches anything remaining (e.g. 9011. matches anything starting with 9011 excluding 9011 itself)
Main Route
VoIP Account Group to Use:
Default
Remove Digits From the Beginning of the Dialed Number
Number of Digits to Remove:
1
Add Digits to the Beginning of the Dialed Number
If All VoIP Accounts in Group Are in Use, Use Alternate Route 1
OK
Cancel

Figure 7.269. Edit Dial Plan Entry

This screen is divided into two main sections, 'Dial Pattern' and 'Main Route'. When a caller from any extension dials a number that matches the dial pattern, the PBX will attempt to route the call according to the defined route conditions. According to the default dial plan entry above, when a caller dials "9", the call will be routed to an external line through the 'Default' VoIP account group, and the dialed "9" digit will be omitted. The caller will then be able to place an external call by simply dialing the desired telephone number.

7.7.6.2. Adding a Dial Plan Entry

The dial plan mechanism enables you to manipulate the number dialed by the caller, by adding or omitting digits. This can be used for various purposes, such as reaching an external line, replacing telephony proxies' dialing codes, and even defining speed dial shortcuts. To define a new dial plan entry, click the 'New Dial Plan Entry' link. The 'Edit Dial Plan Entry' screen appears (see figure Figure 7.269).

Dial Pattern Type the pattern of the dialed digits. Use the pattern syntax as specified.

VoIP Account Group to Use Select the VoIP account group through which you would like to route the call.

Remove Digits From the Beginning of the Dialed Number Select this option to ignore one or more of the digits specified in the dial pattern before dialing the telephone number. When this option is selected, the screen will refresh, adding the following field:

Number of Digits to Remove Enter the number of digits to remove.

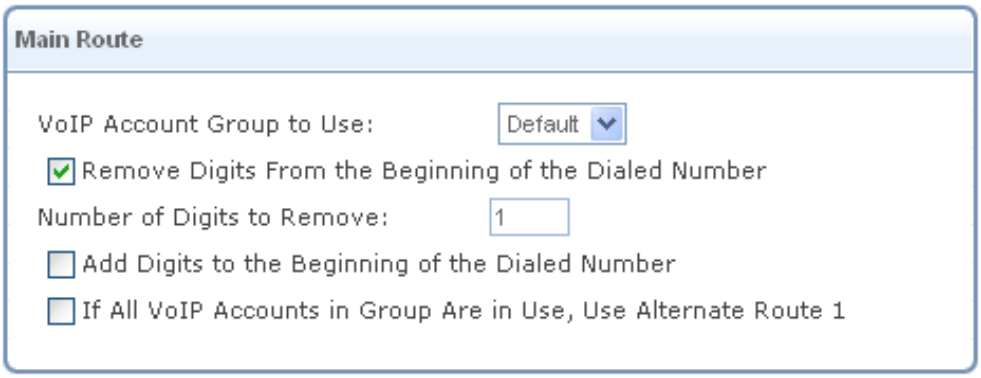

Main Route
VoIP Account Group to Use:
Default
Remove Digits From the Beginning of the Dialed Number
Number of Digits to Remove:
1
Add Digits to the Beginning of the Dialed Number
If All VoIP Accounts in Group Are in Use, Use Alternate Route 1

Figure 7.270. Number of Digits to Remove

Add Digits to the Beginning of the Dialed Number Select this option to add digits before dialing the telephone number. When this option is selected, the screen will refresh, adding the following field:

Digits to Add Specify the digits to be added before the telephone number.

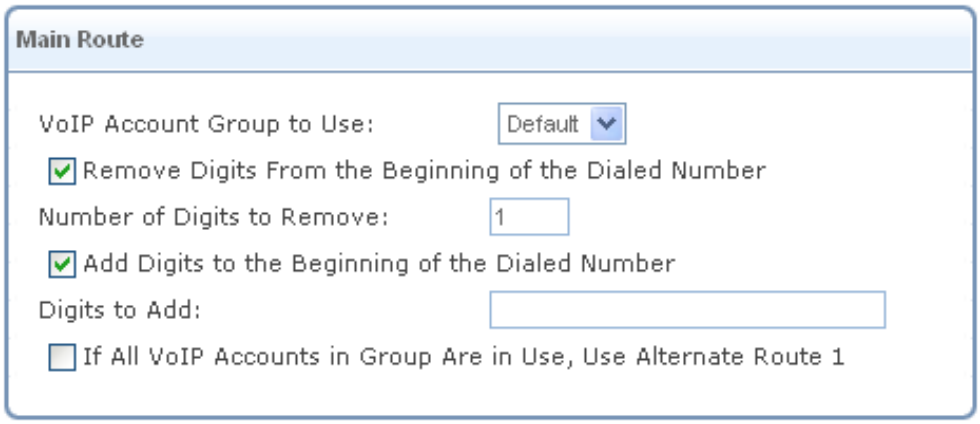

Main Route
VoIP Account Group to Use:
Default
Remove Digits From the Beginning of the Dialed Number
Number of Digits to Remove:
1
Add Digits to the Beginning of the Dialed Number
Digits to Add:
If All VoIP Accounts in Group Are in Use, Use Alternate Route 1

Figure 7.271. Digits to Add

If All VoIP Accounts in Group Are in Use, Use Alternate Route 1 Select this option to provide an alternative route for the dialed call, in case all VoIP accounts in the account group specified are in use. When this option is selected, the screen will refresh, adding the following section:

Alternate Route 1 This section is identical to the 'Main Route' section above, enabling you to select a different set of parameters, thus expanding a call's routing options. You can further select the alternate route option, to create Alternate Route 2, and so on.

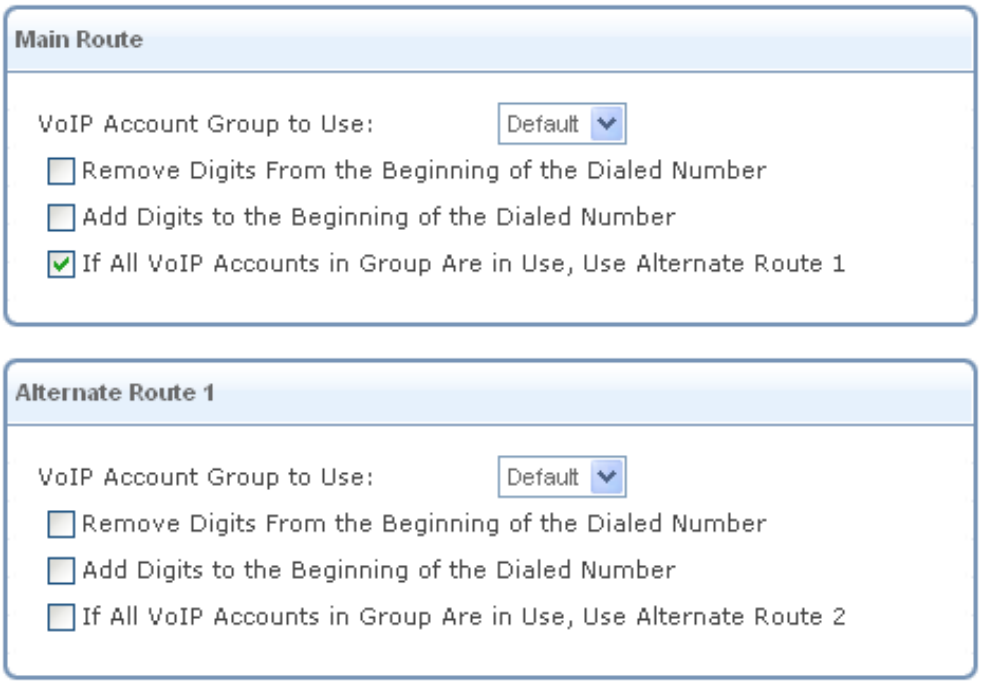

Main Route
VoIP Account Group to Use:
Default
Remove Digits From the Beginning of the Dialed Number
Add Digits to the Beginning of the Dialed Number
If All VoIP Accounts in Group Are in Use, Use Alternate Route 1
Alternate Route 1
VoIP Account Group to Use:
Default
Remove Digits From the Beginning of the Dialed Number
Add Digits to the Beginning of the Dialed Number
If All VoIP Accounts in Group Are in Use, Use Alternate Route 2

Figure 7.272. Alternate Route 1

7.7.7. Music On-Hold

While callers are placed on hold, they will hear background music playing. In order to use OpenRG's default music or upload your own music files, you must first connect an external storage device to your board. To upload an on-hold music file, perform the following:

1. Press the 'Music On-Hold' tab in the PBX main screen (see figure Figure 7.242). The following screen appears:

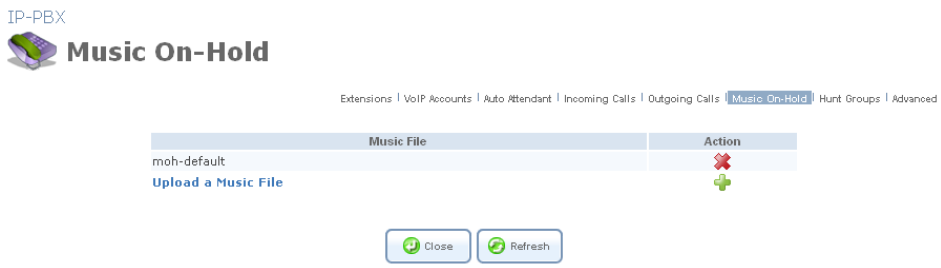


Figure 7.273. Music On-Hold Tab

2. Click the 'Upload a Music File' link. The following screen will appear:

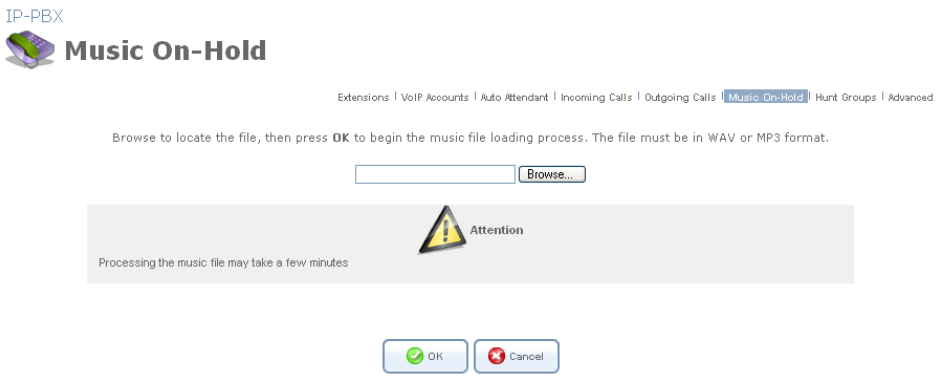

IP-PBX
Music On-Hold
Extensions | VoIP Accounts | Auto Attendant | Incoming Calls | Outgoing Calls | Music On-Hold | Hunt Groups | Advanced
Browse to locate the file, then press OK to begin the music file loading process. The file must be in WAV or MP3 format.
Browse...
Attention
Processing the music file may take a few minutes
OK
Cancel

Figure 7.274. Browse For a Music File

3. Press the 'Browse' button to open a browsing window on your computer and select the WAV or MP3 format file to upload.

4. Click 'OK' to begin the upload. Note that this may take several minutes, depending on the size of your file(s).

7.7.8. Hunt Groups

Your PBX features Hunt Groups for automating distribution of incoming calls to two or more extensions. This allows you to set up groups of operators in order to handle different types of inquiries. For example, you may distribute calls to a sales hunt group and a support hunt group. Moreover, you can control the distribution of calls within a hunt group in a particular order if an extension is busy or unavailable. Since hunt groups are groups of of extensions, once defined they become optional call recipients. The option "Transfer to Hunt Group" will be added as a menu option in the 'Edit Auto Attendant' screen (see figure Figure 7.275) and in the 'Edit Incoming Call Handling' screen (see figure Figure 7.276).

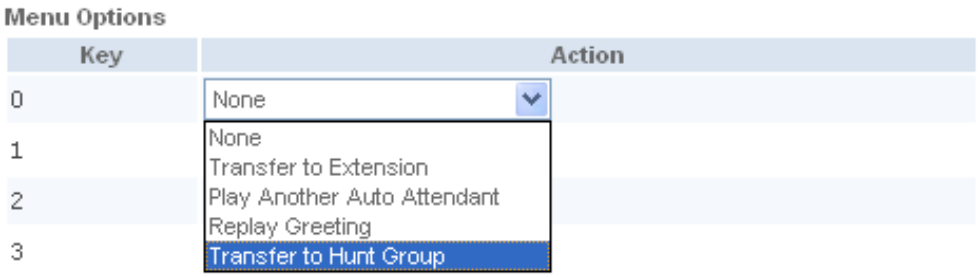


Figure 7.275. Edit Auto Attendant

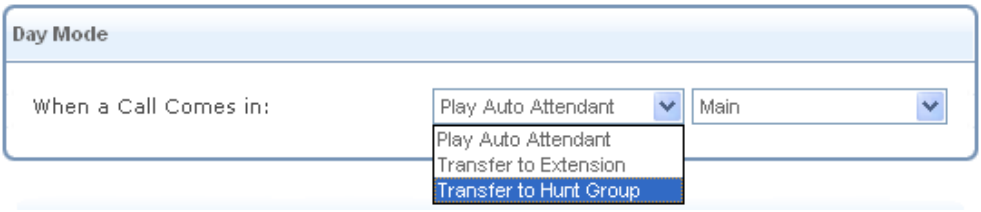


Figure 7.276. Edit Incoming Call Handling

To define a hunt group, press the 'Hunt Groups' tab in the PBX main screen (see figure Figure 7.242). The following screen appears:

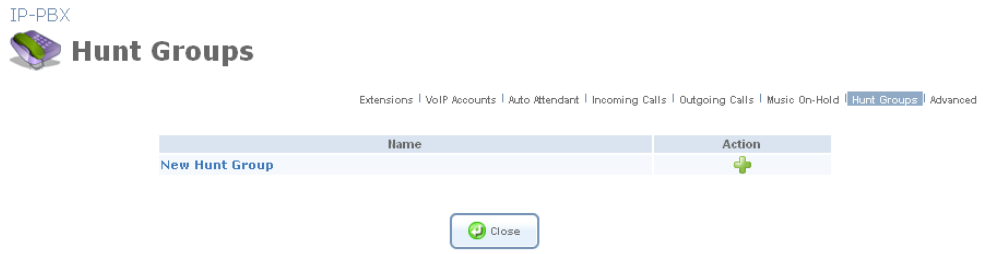

IP-PBX
Hunt Groups
Extensions | VoIP Accounts | Auto Attendant | Incoming Calls | Outgoing Calls | Music On-Hold | Hunt Groups | Advanced
Name
Action
New Hunt Group
Close

Figure 7.277. Hunt Groups Tab

Click the 'New Hunt Group' link. The following screen appears:

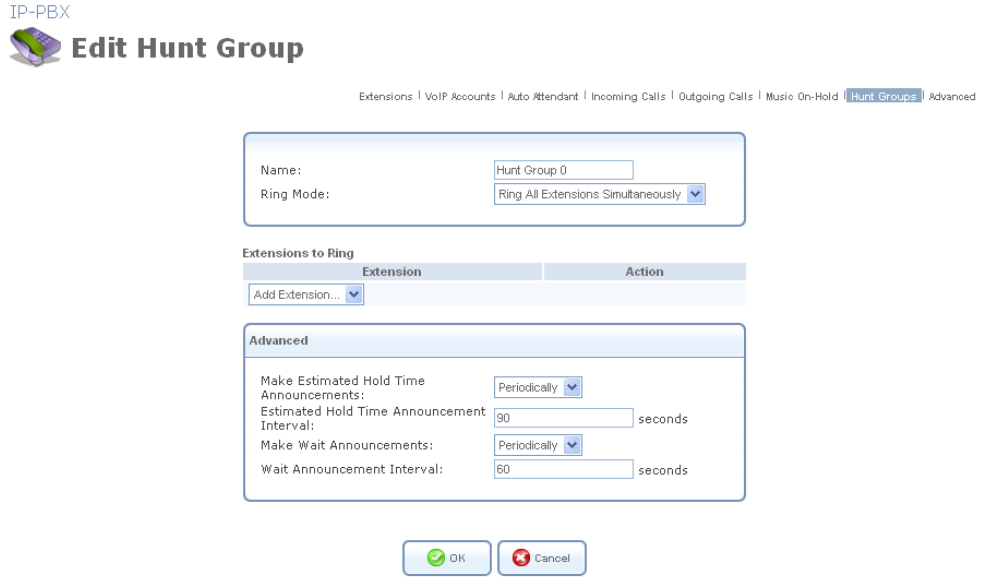


Figure 7.278. Edit Hunt Group

Name The name of the hunt group.

Ring Mode Select whether to ring all extensions at once when a call arrives, where the first operator to answer will accept the call, or to ring one extension at a time in an orderly fashion. Selecting the second choice will refresh the screen:

Figure 7.279. Hunt Group Ring Mode

Time to Ring Each Extension Enter the timeframe in which the call will ring on each extension before being routed to the next.

Extensions to Ring Select the extensions that will participate in this hunt group. The combo box will display all of your available extensions. Note that this step is mandatory, otherwise the hunt group is empty. If you had chosen to ring one extension at a time as your ring mode, by default the ring will be routed between the extensions in their order of appearance in this table. When adding multiple extensions, the action icon and action

icon appear (see figure Figure 7.280), allowing you to easily change the order of the extensions. If you had chosen simultaneous rings, the order of extensions is not relevant.

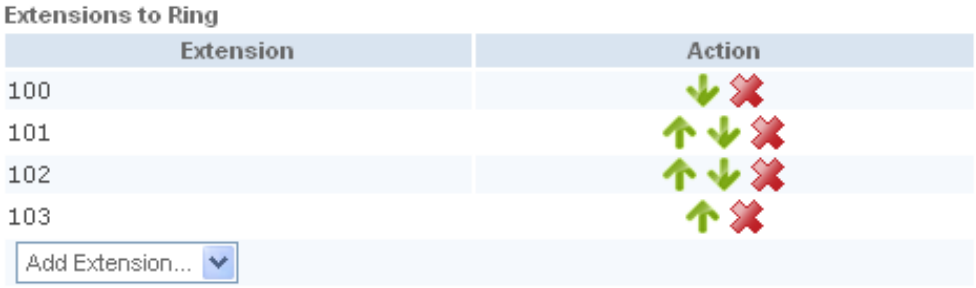


Figure 7.280. Extensions to Ring

Ring Order The ringing cycle order, used to determine the cycle's starting point, or which extension will ring first. This field appears only if you had chosen to ring one extension at a time as your ring mode. In this mode, the extensions will ring one after the other in a cyclic manner, according to their order in the 'Extensions to Ring' table. Select the ring order algorithm to be used:

- Round Robin -- The extensions take orderly turns at being the first extension to ring. The order of the turns is the same order defined for the ringing cycle.
- Least Recent -- The first extension to ring is the one that has been idle for the longest time.
- Random -- The first extension to ring will be chosen randomly.

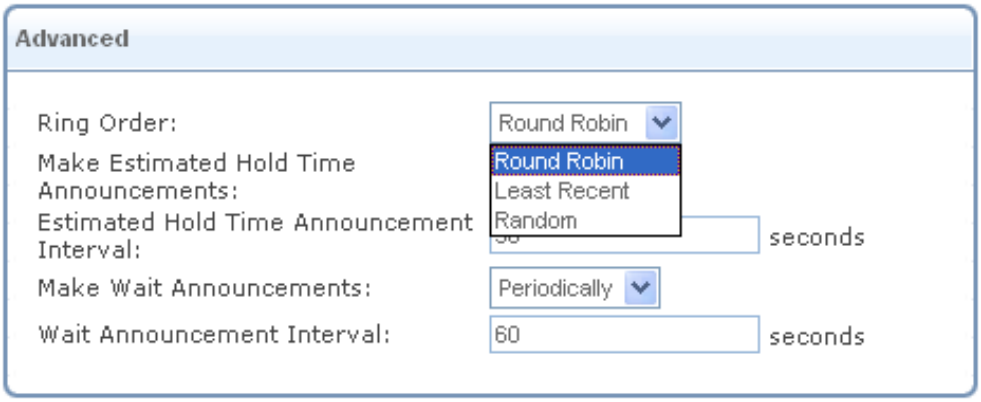


Figure 7.281. Ring Order

Make Estimated Hold Time Announcements Hold time announcements include messages asking the caller to please hold, as well as informing him/her of their number in the queue of calls. These messages are played in addition to the on-hold music played in the background. Select whether to play these messages periodically, once, or not at all.

Estimated Hold Time Announcement Interval Enter the number of seconds before the hold time announcements will be repeated. Note that if you had chosen to play the announcements once or not at all, this field will not be visible.

Make Wait Announcements Wait announcements are messages asking the caller to please hold. Select whether to play this message periodically or not at all.

Wait Announcement Interval Enter the number of seconds before the wait announcement will be repeated. Note that if you had chosen not to play the announcement at all, this field will not be visible.

7.7.9. Advanced

The 'Advanced' screen enables configuration of advanced settings. Some of these settings are platform-specific, and therefore may not be available with your gateway's software.

7.7.9.1. Voice Mail

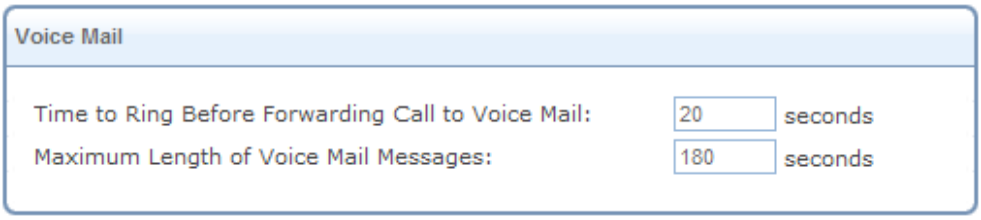


Figure 7.282. Advanced -- Voice Mail

Time to Ring Before Forwarding Call to Voice Mail The timeframe in seconds until the call will be forwarded to the voice mail.

Maximum Length of Voice Mail Messages The maximal length in seconds of a message that can be recorded.

7.7.9.2. Call Park

Call parking allows you to put a call on hold at one extension and continue the conversation from any other extension on your PBX.

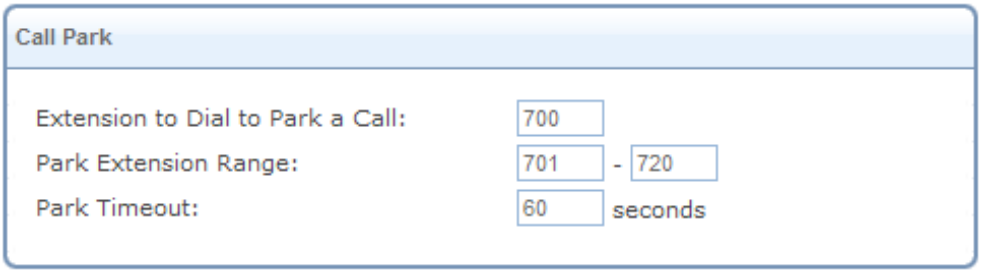


Figure 7.283. Advanced -- Call Park

Extension to Dial to Park a Call The extension number that must be dialed in order to park the call. When dialing this number, an answering machine will say a parking extension number that you must dial from any other extension on the PBX in order to resume the parked call.

Park Extension Range The range of parking extension numbers that are available for the system to provide a caller parking a call.

Park Timeout The duration (in seconds) for which the call is parked. During this timeframe, the call can be picked up from any extension on the PBX by dialing the parking extension number provided. After this timeframe, the extension from which the call was parked will ring to resume the call.

7.7.9.3. SIP

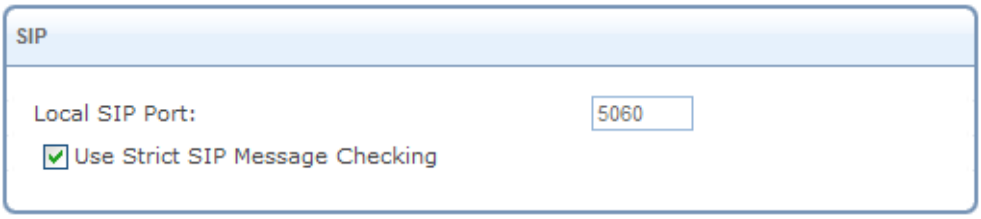


Figure 7.284. Advanced -- SIP

Local SIP Port The port on OpenRG that listens to SIP requests from the proxy. By default, port 5060 is used for SIP signaling of phones connected to the gateway. A common problem occurs when using a SIP agent on the LAN (for example, an IP phone). A SIP agent requires port forwarding configuration (refer to Section 7.3.3), which uses the same port—5060. This multiple use of the port causes failure of either or both services. Therefore, when configuring port forwarding for a SIP agent, you must change OpenRG's SIP port value (for example, to 5062). Note that the calling party must be made aware of this value when initiating a direct call (not using a proxy).

7.7.9.4. H.323

Register with a Gatekeeper Register the user with a gatekeeper, allowing other parties to call the user through the gatekeeper. When this item is checked, the following fields become visible:

Gatekeeper Address The IP address or name of the primary gatekeeper. Note that with RADVISION, this field can only be an IP address in dotted number notation.

Gatekeeper Port The port on which the primary gatekeeper is listening for connections.

Specify Gatekeeper ID Select whether a gatekeeper ID should be used for the primary H.323 gatekeeper.

Gatekeeper ID The identifier for the primary H.323 gatekeeper.

Registration Time to Live Specify the valid duration of the H.323 gatekeeper registration in seconds.

Use Alternate Gatekeeper Select this check-box to configure an alternate gatekeeper for redundancy. When this item is checked, the following fields become visible:

Alternate Gatekeeper Address The IP address or name of the alternate gatekeeper.

Alternate Gatekeeper Port The port on which the alternate gatekeeper is listening for connections.

Use Fast Start The fast start connection method can result in quicker connection establishment, depending on the remote party's settings. Note that Microsoft NetMeeting does not support this option, so in order to interoperate with Microsoft NetMeeting, you should disable the feature.

Use H.245 Tunneling Indicates whether H.245 packets should be encapsulated within H.225 packets.

Local H.323 Port Specify the port number to use for H.323 signaling.

DTMF Transmission Method DTMFs are the tones generated by your telephone's keypad.

Inband The DTMF keypad tones are sent within the voice stream.

Out-of-Band Always (RFC2833) The DTMF keypad tones are represented by the keypad number and are sent as separate packets. This is a more reliable transmission method.

Q.931 Keypad The DTMF keypad tones are sent using Q.931 messages.

H.245 Alphanumeric The DTMF keypad tones are sent using an H.245 alphanumeric Information Element (IE).

H.245 Signal The DTMF keypad tones are sent using an H.245 signal IE.

7.7.9.5. MGCP

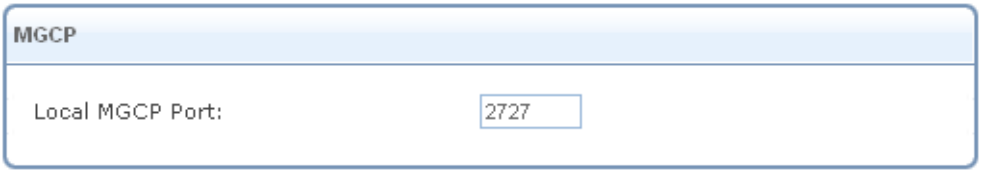


Figure 7.285. Advanced -- MGCP

Local MGCP Port The port OpenRG uses for MGCP connections.

7.7.9.6. RTP

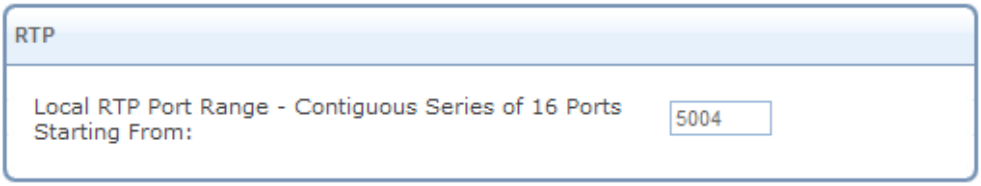


Figure 7.286. Advanced -- RTP

Local RTP Port Range - Contiguous Series of 32 Ports Starting From Defines the port range for Real Time Protocol (RTP) voice transport.

7.7.9.7. Quality of Service

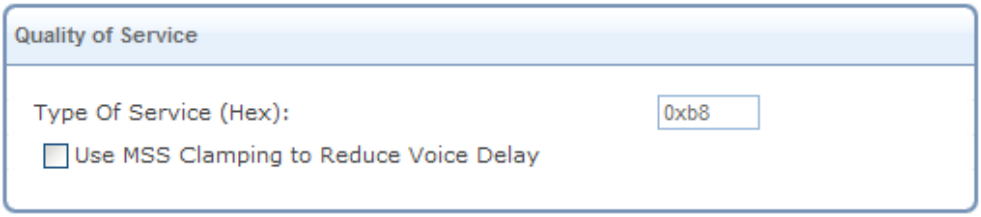


Figure 7.287. Advanced -- Quality of Service

Type of Service (HEX) This is a part of the IP header that defines the type of routing service to be used to tag outgoing voice packets originated from OpenRG. It is used to tell routers along the way that this packet should get specific QoS. Leave this value as 0XB8 (default) if you are unfamiliar with the Differentiated Services IP protocol parameter.

Use MSS Clamping to Reduce Voice Delay When using Maximum Segment Size (MSS) Clamping, TCP streams routed via OpenRG when a voice call is active, will have a smaller segment size. This will cause RTP to receive better priority, and will help prevent high voice jitter that is caused by slow upstream transmission rate, which is common with most WAN connections (DSL, DOCSIS, etc.). When checking this option, the 'Maximum Segment Size (MSS)' field will appear, where you can change the maximal segment size.

7.7.9.8. Echo Cancellation

This feature is currently available on such platforms as Intel IXP425, Mindspeed Malindi2 and Conexant Solos, as well as on platforms with the VINETIC chipset.

Echo Cancellation is the elimination of reflected signals ("echoes") made noticeable by delay in the network. This also improves the bandwidth of the line. When the delay of a voice call exceeds acceptable limits, OpenRG will protect the far end from receiving any echo generated at the local end and sent back through the network.

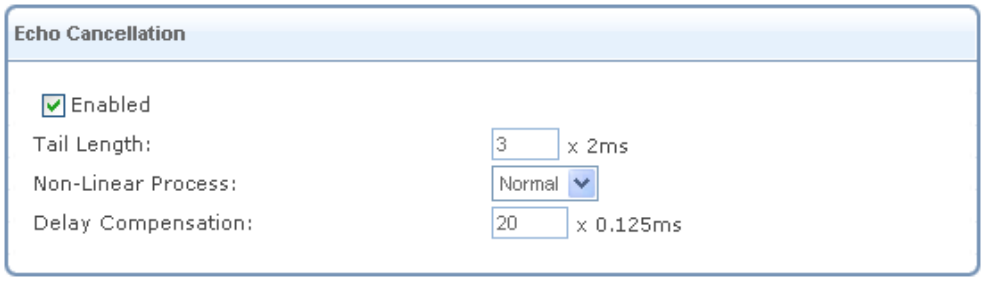


Figure 7.288. Advanced – Echo Cancellation

Note: On some platforms, the feature's graphic interface may differ from the one presented in this figure.

Enabled Check or un-check this box to enable or disable this feature.

Tail Length Defines the length of the elapsed time frame used for calculating the extrapolation of the echo cancellation. A long tail improves the echo cancellation, but increases the load on the Digital Signal Processor (DSP).

Non-Linear Process (NLP) Determines the type of calculation that is used for removing the echo effect. You can set this feature to Normal, High or Off. Using high NLP improves the echo cancellation, but increases the load on the DSP.

Delay Compensation A time delay compensating the echo cancellation.

7.7.9.9. Silence Suppression

The Silence Suppression feature allows optimization to be made when no speech is detected. With this feature enabled, OpenRG is able to detect the absence of audio and conserve bandwidth by preventing the transmission of "silent packets" over the network.

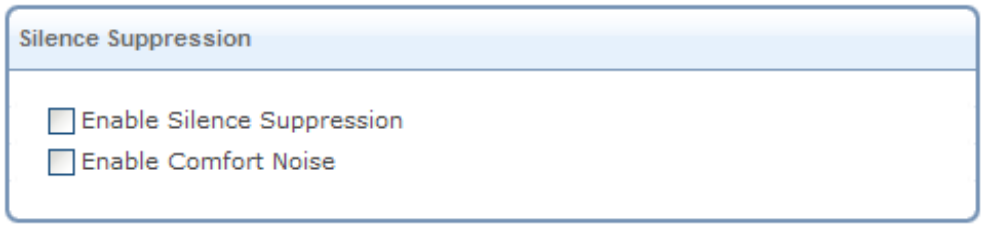


Figure 7.289. Advanced – Silence Suppression

Enable Silence Suppression Check this box to enable this feature.

Enable Comfort Noise Select this option to play a soft "comfort" noise if the other side is performing silence suppression, in order to signal your caller that the conversation is still active.

7.7.9.10. Jitter Buffer

A Jitter Buffer is a shared data area where voice packets can be collected, stored, and sent to the voice processor in evenly spaced intervals. Variations in packet arrival time, called "jitter", can occur because of network congestion, timing drift, or route changes. The jitter buffer intentionally delays the arriving packets so that the end user experiences a clear connection with very little sound distortion.

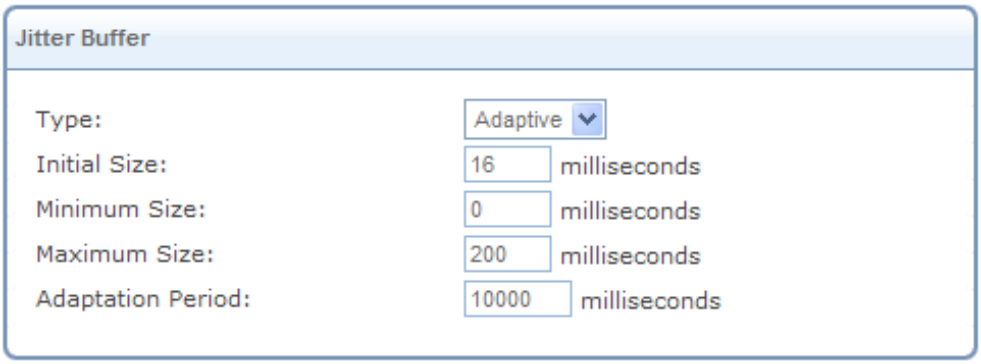


Figure 7.290. Advanced – Jitter Buffer

Type The type of the jitter buffer. Can be either adaptive or fixed. In case of adaptive jitter buffer, the following fields are visible:

Adapt According to Determines whether the jitter buffer size depends on the packet length or on the estimated network jitter.

Scaling Factor The size of the jitter buffer is Scaling Factor multiplied by packet length or by estimated network jitter (depending on the value of the previous field).

Local Adaptation The jitter buffer modifies its size during silence gaps. This way the change in delay is not noticed by the listener. This parameter determines when to perform this adaptation. The options are:

Off Regard as silence packets only those packets that the far end has marked as such.

On Regard as silence packets both the packets that the far end detected, and the packets that were locally detected as speech gaps.

On with sample interpolation No silence is needed. The adaptation is performed gradually through interpolation, so the listener does not notice the jitter buffer change in size. Notice that for this mode, modem or fax transmission could be distorted. This feature should only be used in the case of voice transmission.

Initial Size The initial size of the jitter buffer (in milliseconds).

Maximum Size The maximum size of the jitter buffer (in milliseconds).

Minimum Size The minimum size of the jitter buffer (in milliseconds).

7.7.9.11. FXS Ports

This section contains advanced electronic settings for the FXS (analog) ports, which should only be modified by an experienced administrator or technician.

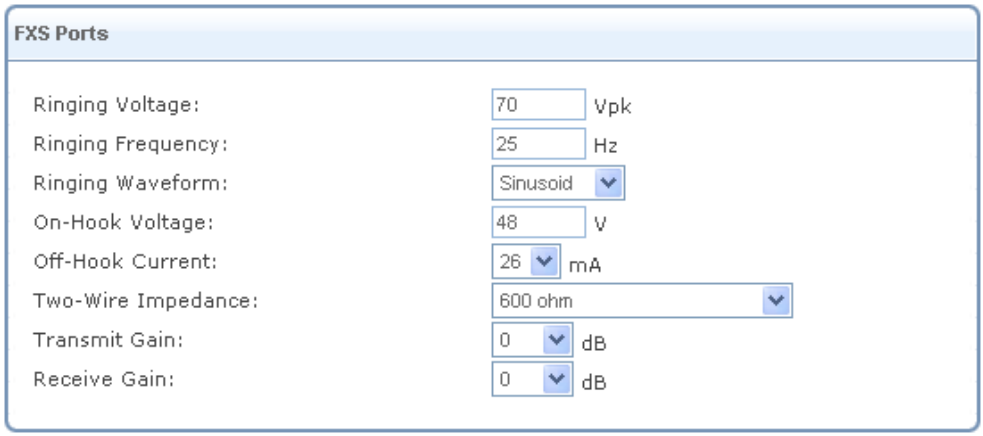


Figure 7.291. Advanced – FXS Ports

Ringing Voltage The ringing voltage in volts.

Ringing Frequency The ringing frequency in hertz.

Ringing Waveform The ringing waveform – sinusoid or trapezoid.

On-Hook Voltage The voltage of an idle handset in volts.

Off-Hook Current Limit The current of an active handset in milli-amperes.

Two-Wire Impedance Select the voice band impedance in ohms, synthesized by the SLIC.

Transmit Gain The transmit gain in decibels.

Receive Gain The receive gain in decibels.

7.7.9.12. On Hook Caller ID Generation

The following settings determine the method by which the caller identity is generated while the handset is on-hook---the telephone is not in use.

Figure 7.292. Advanced -- On Hook Caller ID Generation

Transmission Phase Select when to display the caller ID---either before or after the first ring.

Modulation Type Select the modulation type---Bell 202 or ITU V.23.

FSK Amplitude Enter the Frequency Shift Keying amplitude.

Alerting Info Select DT-AS if alerting information is required. Otherwise, leave as "Not Required".

7.7.9.13. Off Hook Caller ID Generation

The following settings determine the method by which the caller identity is generated while the handset is off-hook---a conversation is active.

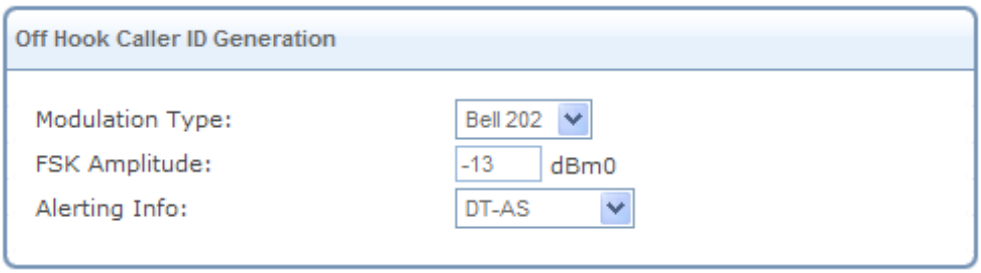


Figure 7.293. Advanced -- Off Hook Caller ID Generation

Modulation Type Select the modulation type---Bell 202 or ITU V.23.

FSK Amplitude Enter the Frequency Shift Keying amplitude.

Alerting Info Select DT-AS if alerting information is required. Otherwise, leave as "Not Required".

7.7.9.14. Hook Flash

The PBX distinguishes between hook and "Flash" button presses by the length of time that the Flash button is pressed. If it is pressed for longer than this timeframe, the press becomes equivalent to a hook press (phone hang-up).

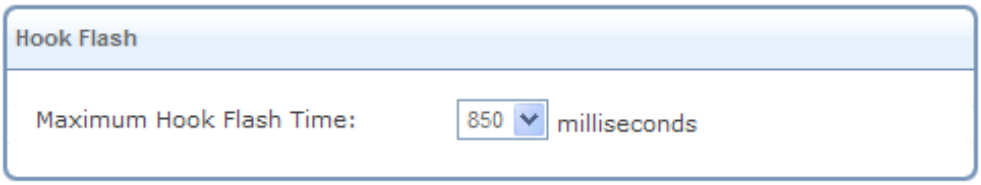


Figure 7.294. Advanced -- Hook Flash

Maximum Hook Flash Time Select the maximum timeframe (between 250 and 850 milliseconds) after which a Flash press hangs up the call.

7.7.10. Using Your Home and Office PBX

You can use your PBX in your office or home, or as depicted in the following scenario, in both. This scenario describes how to quickly setup your PBX by creating extensions. It then guides you how to connect your PBX to the outside world using separate SIP accounts (and matching VoIP accounts) for the office and home. Finally, it describes how to handle your incoming calls using auto attendants, and your outgoing calls utilizing a dial plan.

7.7.10.1. Creating Extensions

Physical telephone ports, if available on your gateway, will be configured with extension numbers by default in the 'Analog Extensions' section of the 'Extensions' screen. However, you can add any number of IP telephony devices to your LAN.

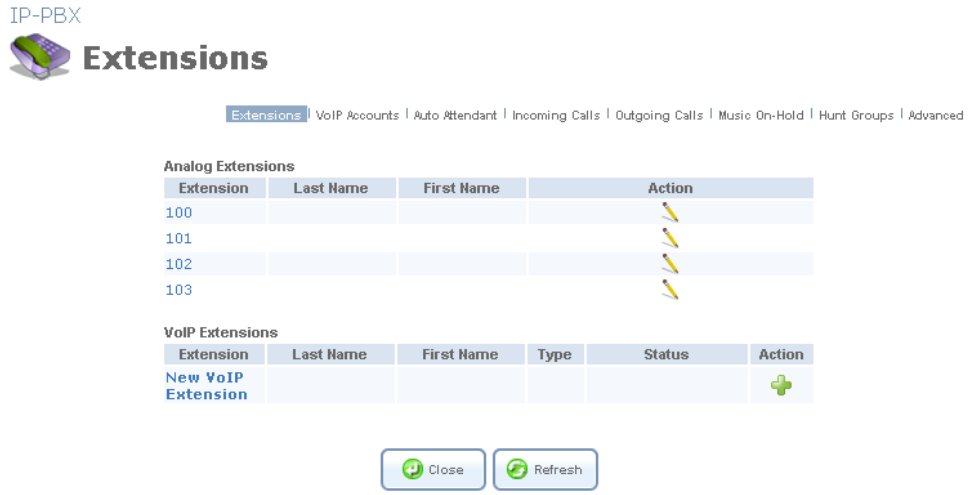


Figure 7.295. PBX Main Screen

To set up an IP telephone on your gateway, perform the following:

1. Connect a VoIP telephone to your gateway's LAN.
2. Configure its SIP proxy with 192.168.1.1 and its SIP user ID with an extension number of your choice. Refer to the device's documentation to learn how to do this.

1. To add a VoIP extension, click the 'New VoIP Extension' link. The 'Edit Extension' screen appears.

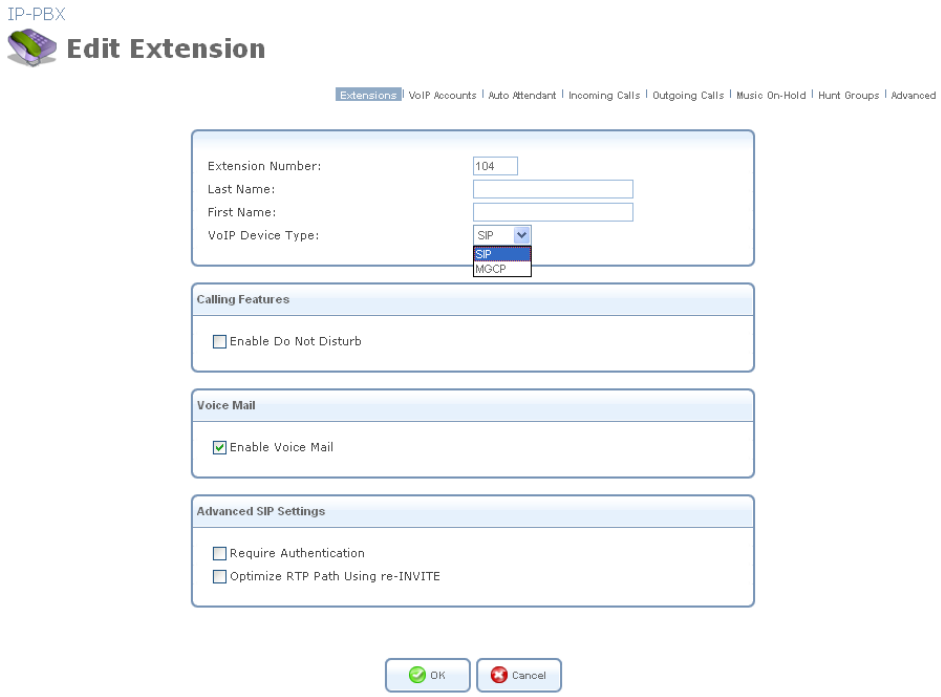


Figure 7.296. Edit Extension -- SIP

2. Enter the extension number assigned to the VoIP device in the 'Extension Number' field. You may also enter the extension owner's last and first names.
3. Click 'OK' to save the settings.

1. Verify that the status of the extension changes to "Registered". Your VoIP device is now ready to be used.

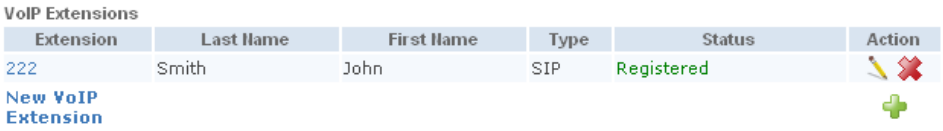


Figure 7.297. VoIP Extensions

7.7.10.2. Accessing the Voice Mail

Every extension features its own voice mailbox. To access an extension's voice mail application, perform the following:

1. Pick up the handset, and dial ***1234** . An attendant will ask for a password.
2. Dial your password. The default password is **0000#** .

As soon as you enter the voice mail application, the attendant will prompt you to press different keys for various options. Navigate through these options to perform all voice mail operations.

7.7.10.3. Opening SIP Accounts

Before you can connect to a SIP server, it is necessary that you obtain a SIP account. The following section describes how to open a free world-wide dialing SIP account. You can also obtain a paid SIP account.

Note: Free accounts limit placing calls to 1-800 numbers and other free account holders only, while paid services offer access to any number.

To open a "Free World Dialup" ("FWD") SIP account:

- Browse to http://www.pulver.com/fwd .
- Press the 'Get FWD!' button on the top-right. You do not need to purchase a phone nor download any software.
- Click the 'Sign Up' link in Step 1 and open an account.

In both cases, you should get instructions by e-mail containing your ID and password, and a SIP IP address. If your gateway's Digital Signal Processing (DSP) module supports the Distinctive Ring service (available on some SIP servers), you can enrich your telephone line functionality by:

- Creating additional numbers for your line, and assigning a distinctive ring pattern to each of them. This is useful, for example, if you want to distinguish between incoming calls intended for you, and those intended for other members of the family.
- Assigning a distinctive ring pattern to the incoming calls, by matching the caller ID to a specific ring tone. By doing so, you can recognize the caller's identity before answering the call.

Note: The availability of the service implementations depends on the SIP service provider.

To activate the Distinctive Ring service, you must first create a SIP account on a server that supports this feature. Examples of such SIP servers are Broadsoft (http://www.broadsoft.com) and Broadvoice (http://www.broadvoice.com). After registering and configuring your SIP account, enter the SIP account settings and the proxy parameters in OpenRG's 'Line Settings' screen, as described in section Section 7.6.7.4 .

Note: This evaluation scenario requires two separate SIP accounts -- one for office use and one for home use. You must therefore open an additional SIP account, either with FWD as depicted above or with another provider of your choice.

7.7.10.4. Defining SIP VoIP Accounts

After creating two SIP accounts and obtaining the necessary details, configure OpenRG as follows:

1. Click the 'VoIP Accounts' tab in the PBX main screen (see figure Figure 7.295). The following screen appears:

Figure 7.298. VoIP Accounts Tab

2. Click the 'New VoIP Account' link. The 'Edit VoIP Account' screen appears (see figure Figure 7.299).

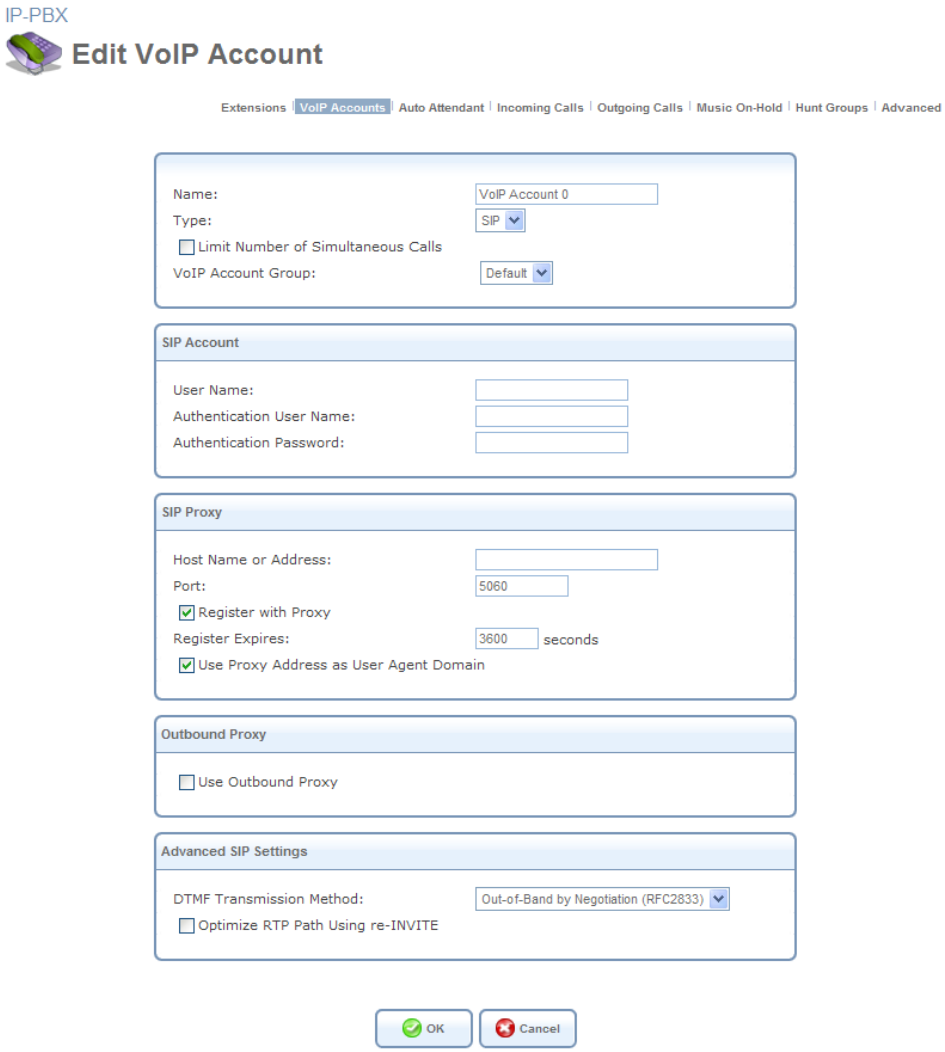


Figure 7.299. Edit VoIP Account

3. Type "Office" as the name for this VoIP account, as it will simulate your office account.

4. Enter your newly obtained ID in the 'User Name' field.

5. Enter your newly obtained username in the 'Authentication User Name' field.

6. Enter your newly obtained password in the 'Authentication Password' field.

7. Enter the IP address or host name you received when registering your SIP account in the 'Host Name or Address' field. Your free account's host name should be "fwd.pulver.com" (this may vary; you should check your registration e-mail).

8. Select the 'Use Proxy Address as User Agent Domain' option to use the set proxy or its IP address as a domain name for the outgoing SIP messages. Otherwise, uncheck this option and enter another domain name or IP address in the 'User Agent Domain' field.

9. Check the 'Use Outbound Proxy' check-box. The free world-wide dialing service is an example of a service provider that requires the use of an outbound proxy. Once checked, the following fields become visible:

Figure 7.300. Outbound Proxy

1. Enter the outbound proxy's IP address or host name that you received when registering your SIP account in the 'Host Name or Address' field. Your free account's outbound proxy's name should be "fwdnat.pulver.com" (this may vary; you should check your registration e-mail).

2. Set the outbound proxy's 'Port' field to 5082 (this may also vary).

10. Click 'OK' to save the settings.

Verify that the status of the VoIP account changes to "Registered". Your SIP account is now ready to be used. In the same manner as described above, define another VoIP account named "Home", which will simulate your home account. You may define VoIP accounts for as many SIP proxy accounts as you have, designating each account for a different purpose.

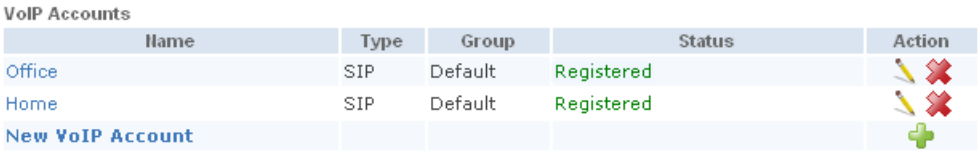


Figure 7.301. VoIP Accounts

7.7.10.5. Creating Auto Attendants

The PBX enables you to customize a menu of multiple auto attendants for your office and home VoIP accounts. In this example, the default 'Main Auto Attendant' will be used for the office. Optional auto attendants will describe the office location, and inform of the office working hours (an off-hours message). First, create these optional auto attendants, by performing the following:

- "Office Directions" Auto Attendant

1. Click the 'Auto Attendant' tab in the PBX main screen (see figure Figure 7.295). The following screen appears:

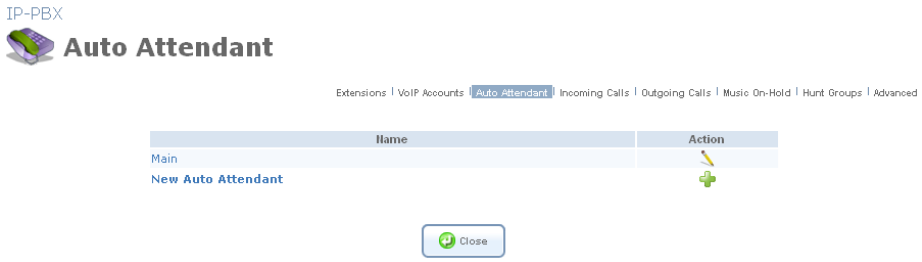


Figure 7.302. Auto Attendant Tab

2. Click the 'New Auto Attendant' link. The 'Edit Auto Attendant' screen appears:

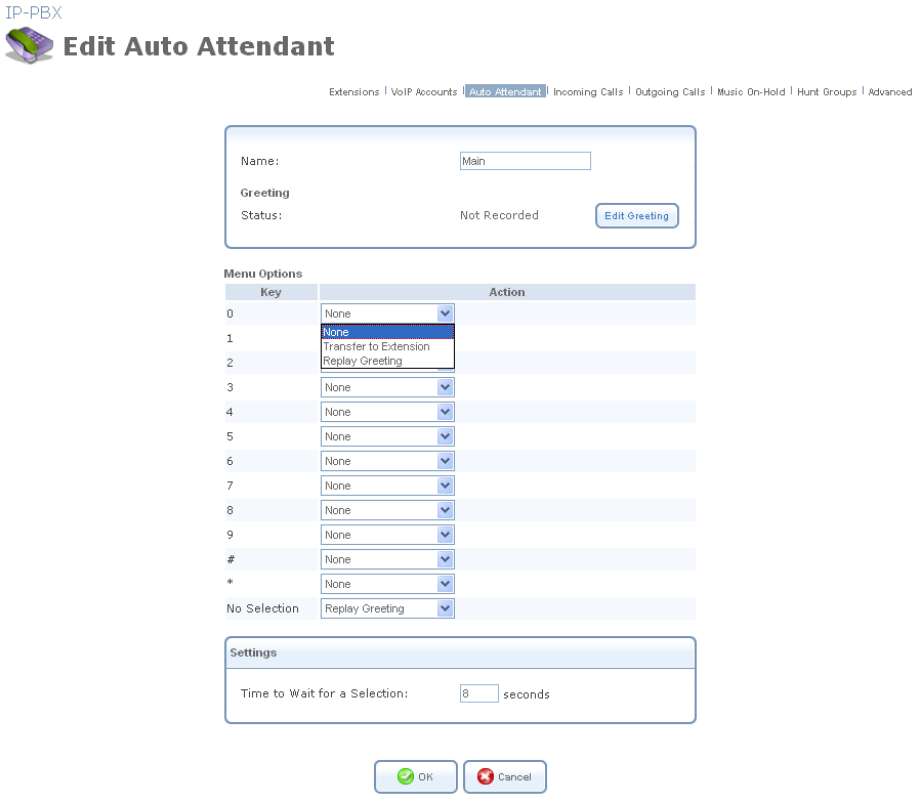


Figure 7.303. Edit Auto Attendant

3. Type "Office Directions" as the name for this auto attendant.

4. Press the 'Edit Greeting' button. The 'Auto Attendant Greeting' screen appears:

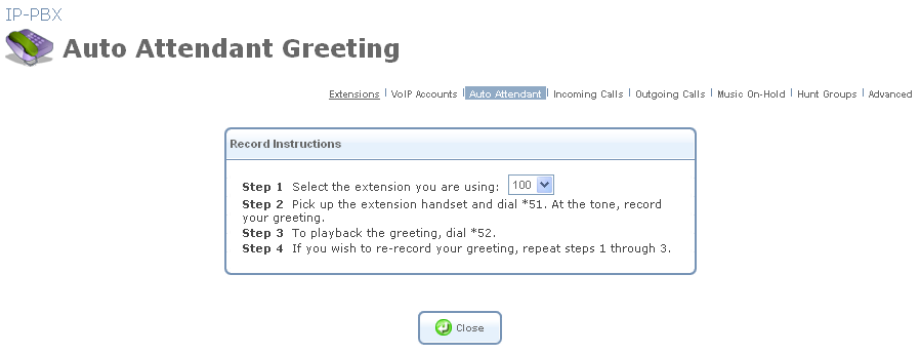

IP-PBX
Auto Attendant Greeting
Extensions | VoIP Accounts | Auto Attendant | Incoming Calls | Outgoing Calls | Music On-Hold | Hunt Groups | Advanced
Record Instructions
Step 1 Select the extension you are using:
100
Step 2 Pick up the extension handset and dial *51. At the tone, record your greeting.
Step 3 To playback the greeting, dial *52.
Step 4 If you wish to re-record your greeting, repeat steps 1 through 3.
Close

Figure 7.304. Auto Attendant Greeting

5. Follow the instructions in this screen to record the message directing to your office location. Note that in **Step 1** you must select the extension through which you are recording the message. *Important:* When done, press the 'Close' button.

6. Select 'Play Another Auto Attendant' for the 'No Selection' menu option. At the end of the attendant's playback, the only other auto attendant available at this time (the 'Main Auto Attendant) will be played.

7. Click 'OK' to save the settings.

- "Working Hours" Auto Attendant Follow the above procedure to create yet another auto attendant, informing the caller of your office working hours. This auto attendant will be played in the timeframe which you will later

on define as non-business hours. **Important:** Skip **Step 6** -- the auto attendant will be replayed until the call is terminated.

- "Office" Auto Attendant Edit the 'Main Auto Attendant' as your main office attendant application:

  1. Click the 'Main Auto Attendant' link. The 'Edit Auto Attendant' screen appears (see figure Figure 7.303).

  2. Type "Office" as the name for this auto attendant.

  3. Select 'Play Another Auto Attendant' for the **5** key (for example). The screen refreshes, displaying an additional combo box (see figure Figure 7.305).

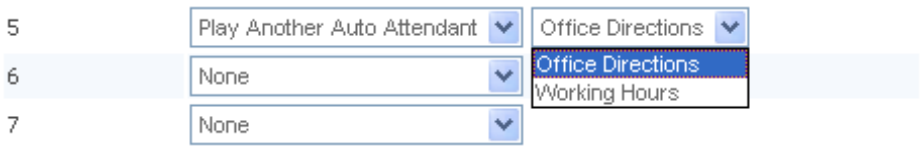


Figure 7.305. Menu Options -- Play Auto Attendant

  4. Select the 'Office Directions' auto attendant.

  5. Press the 'Edit Greeting' button to record your main office message. This message should include the following directives:

     1. Inform the caller that he/she may dial an extension number at any time to be transferred to that extension.

     2. Inform the caller that he/she may press the **5** key to listen to directions on how to get to the office.

  6. Click 'OK' to save the settings.

Your auto attendants are now ready to be used.

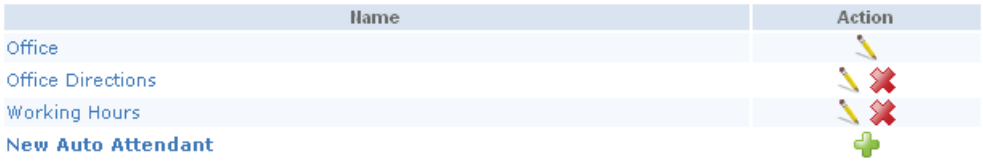


Figure 7.306. Newly Created Auto Attendants

7.7.10.6. Handling Incoming Calls

Once auto attendants have been created, configure the handling of incoming calls:

1. Click the 'Incoming Calls' tab in the PBX main screen (see figure Figure 7.295). The following screen appears:

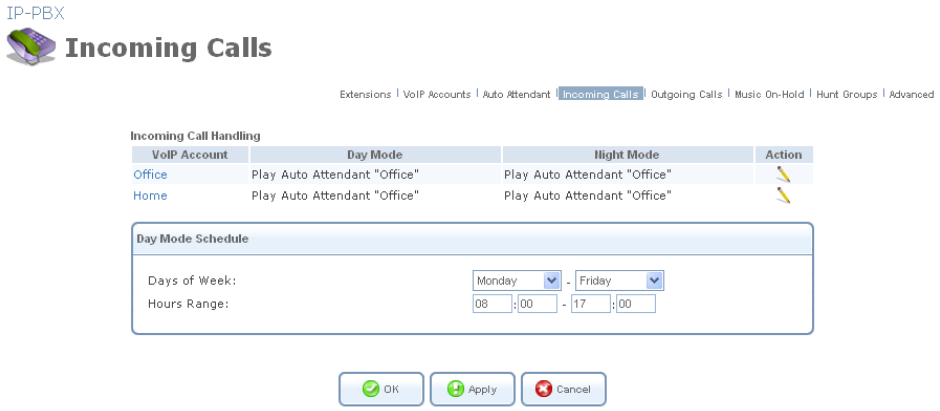


Figure 7.307. Incoming Calls Tab

2. Define your office operation days and hours in the 'Day Mode Schedule' section.

3. Click the 'Office' action icon , and select the following:

   - Select to play the "Office" auto attendant in day mode.
   - Select to play the "Working Hours" auto attendant in night mode.
   - Click 'OK' to save the settings.

Figure 7.308. Edit Incoming Call Handling

4. Click the 'Home' action icon , and select the following:

   - Select to transfer the call to extension **100** in both day and night modes.
   - Click 'OK' to save the settings.

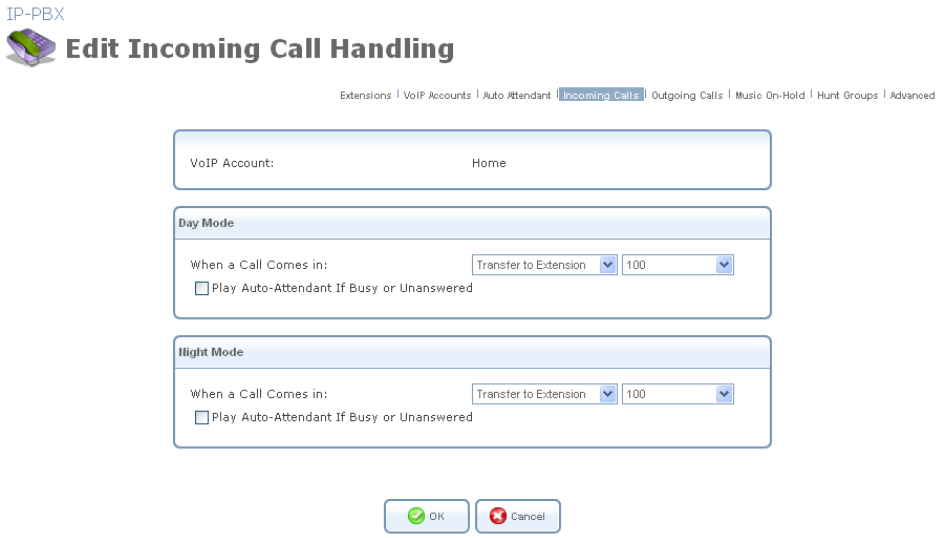


Figure 7.309. Edit Incoming Call Handling

5. Click 'OK' to save the settings.

The result will be as follows:

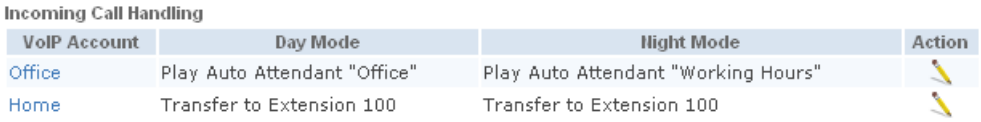


Figure 7.310. Incoming Call Handling

- When a call arrives through the office VoIP account in business hours, your main "Office" attendant will be played, prompting the user to dial any extension number or to press **5** for instructions on how to get to the office. To experience this, you can use the home extension to dial "9" and then your office VoIP account number.
- When a call arrives through the office VoIP account in off-hours, your "Working Hours" attendant will be played, informing the caller of your business hours.
- When a call arrives through the home VoIP account, it will automatically be transferred to extension **100** . To experience this, you can use the office extension to dial "9" and then your home VoIP account number.

7.7.10.7. Handling Outgoing Calls

The dial plan mechanism enables you to manipulate the number dialed by the caller, by adding or omitting digits. This section will demonstrate using the dial plan to overcome an FWD dialing rule. As a rule, FWD requires dialing " ***** " (asterisk) as a prefix to 1-800 numbers. Failure to do so will result in an FWD voice message explaining this requirement. To override this limitation, add the following entry to the dial plan.

1. Press the 'Outgoing Calls' tab in the PBX main screen (see figure Figure 7.295). The following screen will appear:

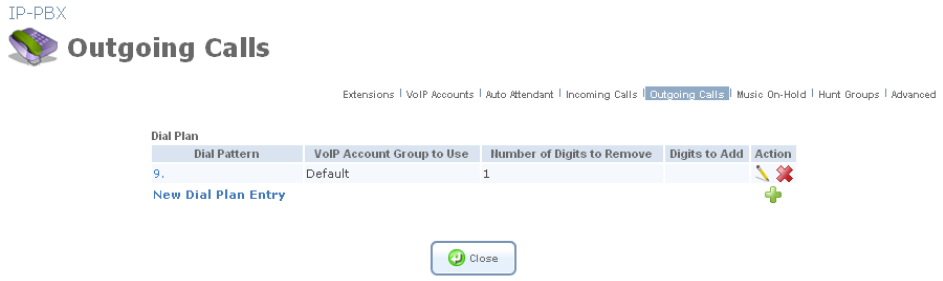


Figure 7.311. Outgoing Calls Tab

2. Click the 'New Dial Plan Entry' link. The 'Edit Dial Plan Entry' screen will appear (see figure Figure 7.312).

IP-PBX
Edit Dial Plan Entry
Extensions | VoIP Accounts | Auto Attendant | Incoming Calls | Outgoing Calls | Music On-Hold | Hunt Groups | Advanced
Dial Pattern:
Pattern Syntax:
X Matches any digit from 0 to 9
Z Matches any digit from 1 to 9
N Matches any digit from 2 to 9
[1235-9] Matches any digit in the brackets (in this example, 1,2,3,5,6,7,8,9)
. Wildcard, matches anything remaining (e.g. 9011. matches anything starting with 9011 excluding 9011 itself)
Main Route
VoIP Account Group to Use:
Default
Remove Digits From the Beginning of the Dialed Number
Add Digits to the Beginning of the Dialed Number
If All VoIP Accounts in Group Are in Use, Use Alternate Route 1
OK
Cancel

Figure 7.312. Edit Dial Plan Entry

3. Enter "91800XXXXXXX" as the dial pattern. This pattern represents every possible 1-800 number, dialed after "9" (for an external call).

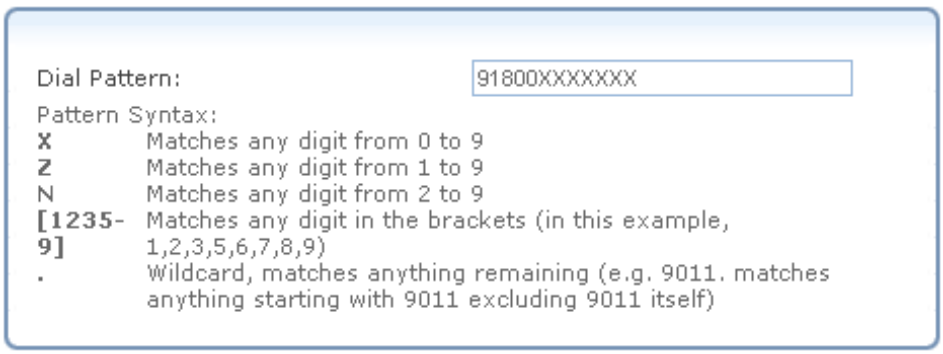

Dial Pattern:
91800XXXXXXX
Pattern Syntax:
X Matches any digit from 0 to 9
Z Matches any digit from 1 to 9
N Matches any digit from 2 to 9
[1235-9] Matches any digit in the brackets (in this example, 1,2,3,5,6,7,8,9)
. Wildcard, matches anything remaining (e.g. 9011. matches anything starting with 9011 excluding 9011 itself)

Figure 7.313. Dial Pattern

4. Select the 'Remove Digits From the Beginning of the Dialed Number' check-box. The screen will refresh, adding the 'Number of Digits to Remove' field. Verify that the value of this field is 1.

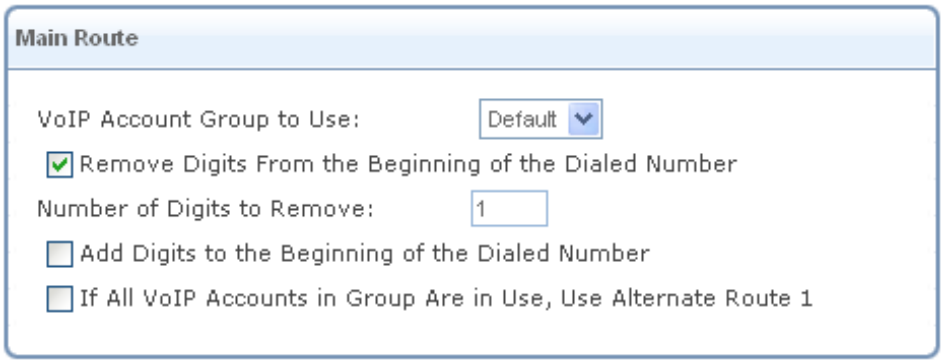

Main Route
VoIP Account Group to Use:
Default
Remove Digits From the Beginning of the Dialed Number
Number of Digits to Remove:
1
Add Digits to the Beginning of the Dialed Number
If All VoIP Accounts in Group Are in Use, Use Alternate Route 1

Figure 7.314. Number of Digits to Remove

5. Select the 'Add Digits to the Beginning of the Dialed Number' check-box. The screen will refresh, adding the 'Digits to Add' field. Enter an " ***** " (asterisk) as the digit to be added.

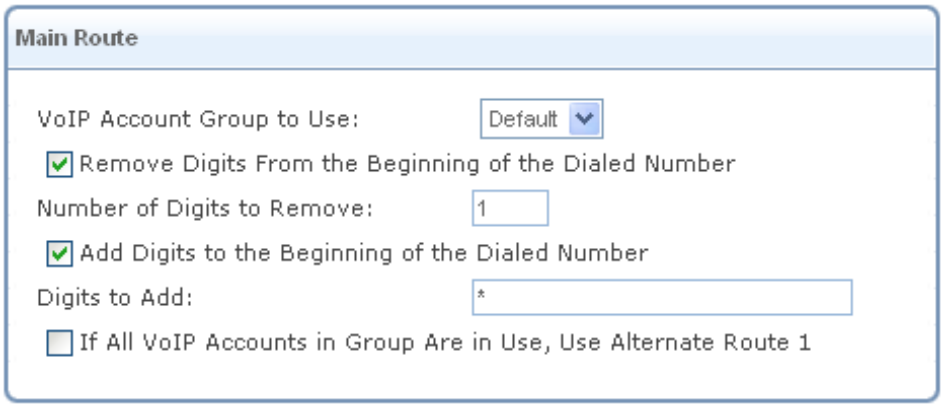

Main Route
VoIP Account Group to Use:
Default
Remove Digits From the Beginning of the Dialed Number
Number of Digits to Remove:
1
Add Digits to the Beginning of the Dialed Number
Digits to Add:
*
If All VoIP Accounts in Group Are in Use, Use Alternate Route 1

Figure 7.315. Digits to Add

6. Click 'OK' to save the settings.

The dial plan entry will be added to the 'Outgoing Calls' screen (see figure Figure 7.316), and will affect all VoIP accounts in the account group selected (in this case, the default VoIP account group).

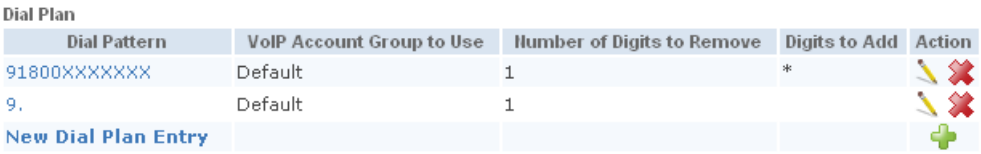


Figure 7.316. Dial Plan

Calls dialed from OpenRG to 1-800 numbers will now be automatically converted into the format required by FWD, concealing its limitation and simplifying telephony operability.

7.7.10.8. Telephone Operation

Phones connected to OpenRG can place calls, put calls on hold, transfer calls and manage 3-way conferences. The following describes how to perform these operations.

- Placing a Call

    1. Pick up the handset on the phone.

2. Dial the remote party's number (begin with **9** for an external call).

- Answering a Waiting Call When the Call Waiting feature is enabled, you may receive a call while engaged in another call. When such call arrives, you will hear a call waiting tone.

  1. To answer a waiting call, press 'Flash'.

  2. 'Flash' may be used to switch back and forth between calls.

- Blind Transfer To transfer an existing call (B) to a third party (C) without consultation, do the following:

  1. Press 'Flash'. Party B will now be placed on hold, and you will hear a dial tone.

  2. Dial party C's number (begin with **9** for an external call).

  3. To complete the transfer, place the phone's handset on-hook. B is now initiating a call to C.

- Call Transfer With Consultation To transfer an existing call (B) to a third party (C), do the following:

  1. Press 'Flash' on the phone. Party B will now be placed on hold, and you will hear a dial tone.

  2. Dial party C's number (begin with **9** for an external call). You can engage in conversation.

  3. To complete the transfer, place the phone's handset on-hook.

- 3-Way Conference To extend an existing call (B) into a 3-way conference by bringing in an additional party (C), do the following:

  1. Press 'Flash' on the phone. Party B will now be placed on hold and you will hear a dial tone.

  2. Dial party C's number (begin with **9** for an external call). You can engage in conversation.

  3. Press 'Flash' to join both C and B to a single conference.

  4. When you place the phone's handset on-hook, party B and party C will remain in conversation.

7.8. Parental Control

The abundance of harmful information on the Internet is posing a serious challenge for employers and parents alike - "How can I regulate what my employee/child does on the net?" OpenRG's Web-filtering allows parents and employers to regulate, control and monitor Internet access. By classifying and categorizing online content, it is possible to create numerous Internet access policies, and easily apply them to your home network computers. As a result, you may keep your children from harm's way by limiting access to adult and violent material, or increase employee productivity by regulating access to non work-related Internet content.
To effectively filter Web content one must first have a good idea of the kind of information that is available on the Internet. It is necessary to formulate a landscape of the accessible content, categorize and classify themes and subjects that may be considered inappropriate.

OpenRG's Parental Control categorization methodology provides an easy and straightforward method for fine-grained content filtering. The Parental Control module is constantly updated with URL-based information classified according to the following categories:

- Child protection
- Recreation and Entertainment
- Personal business
- Bandwidth control

- Advertisements
- Chat
- Remote Proxies and Hosting Sites (possibly untrusted sources)
- Other

Each category can be expanded into subcategories for better content control. For instance, the 'Recreation and Entertainment' category is comprised of subcategories such as:

- Arts and Entertainment
- Education
- Games
- Hobbies and Recreation

7.8.1. Overview

OpenRG's Parental Control service is provided by " Surf Control ", a company specializing in Internet content filtering. Therefore, you need to subscribe to this service in order to use OpenRG's Parental Control. You can subscribe through OpenRG's WBM, as described in the following section.

1. Click the 'Parental Control' tab in the 'Services' screen. The 'Parental Control' screen appears, displaying the 'Overview' tab:

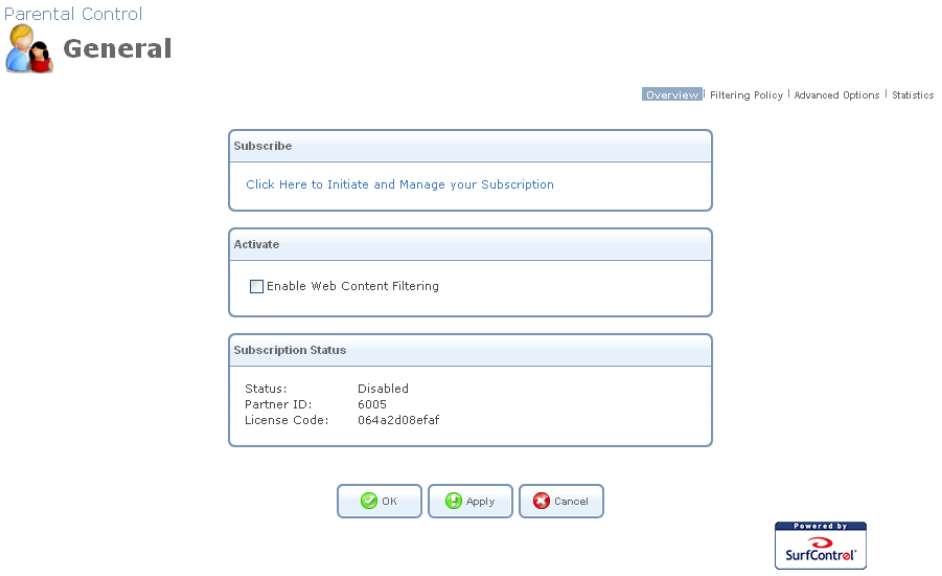


Figure 7.317. General

2. Check the 'Enable Web Content Filtering' check box in the 'Activate' section, and click Apply. A 'Server Status' section is added.
3. If you haven't subscribed yet or your subscription has expired, click the 'Click Here to Initiate and Manage your Subscription' link in the 'Subscribe' section. The Web filtering subscription site will then be displayed in a new browser window.
4. Follow the instructions on the site and subscribe or enroll for a free trial. You will be sent a verification email. Click the link in the verification email. About 20 seconds after clicking the verification link your subscription will be activated.

5. Return to OpenRG's WBM and click the 'Parental Control' tab in the 'Services' screen. The 'Filtering Policy' screen should be displayed with subscription expiry date at the top. If this is not the case, click the 'Advanced Options' tab and then the 'Refresh Servers' button. Wait a few seconds and repeat this step.

7.8.2. Filtering Policy

7.8.2.1. Creating a Filtering Policy

A filtering policy defines what sites will be blocked based on their category. OpenRG provides four built-in policies:

Block All Blocks all access to the Internet.

Allow All Allows unlimited Internet access.

Home Blocks sites under the 'Child Protection' category.

Empolyee Blocks sites from non work-related categories.
These policies can be set from the 'Default Filtering Policy' combo box in the 'Filtering Policy' screen (see figure Figure 7.318). To view or edit the 'Home' and 'Employee' policies, click their respective links in this screen. You may also create your own filtering policies:

1. Click 'Filtering Policy' under the 'Parental Control' tab in the 'Services' screen. The 'Filtering Policy' screen appears:

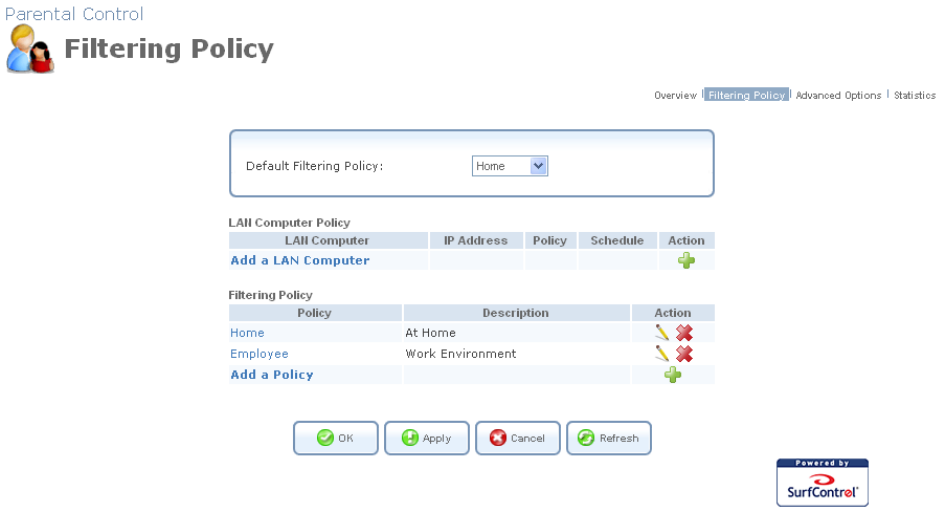


Figure 7.318. Filtering Policy

2. Click the 'Add a policy' link. The following screen appears:

Figure 7.319. Creating a Filtering Policy

3. Enter a name and a description for the new policy.

4. Select the content filtering check boxes that represent content that you wish to block. Selecting a category will automatically select all its sub-categories and vice versa. If you want to make a more refined selection of filtering options, click on the '+' next to each category to display a list of its sub-categories. Note that clicking the '-' of a category will only be possible if all its sub-categories are either checked or unchecked.

5. You can also manually specify a list of Web sites and a list of URL keywords in the provided text fields, to which you can either block or allow access using the combo box provided.

6. Click 'OK' to save the settings.

7.8.2.2. Applying the Filtering Policy

Once you have created different filtering policies, you can either define a default policy that will be applied to all of your LAN computers, or apply different policies to individual computers separately:

- LAN Filtering Policy To select a default filtering policy for the LAN, select the policy name from the 'Default Filtering Policy' combo box located in the 'Filtering Policy' screen (see figure Figure 7.318), and click Apply.

- PC Filtering Policy To apply separate policies to individual home computers, perform the following:

  1. In the 'Filtering Policy' screen (see figure Figure 7.318), click the 'Add a LAN Computer' link. The 'LAN Computer Policy' screen will appear (see figure Figure 7.320).

Figure 7.320. LAN Computer Policy

2. Enter the name or IP address of the LAN computer to which you wish to apply a policy.
3. Select the policy you wish to apply in the 'Policy' combo box.
4. In the 'Schedule' combo box, select "Always" to permanently apply this policy, a schedule (if you have already defined one), or "User Defined" in order to commence a sequence that will add a new schedule.
5. Back in the 'Filtering Policy' screen, use the check box next to the computer name in order to enable or disable its policy.
6. Click 'OK' to save the settings.

7.8.3. Advanced Options

Click 'Advanced Options' under the 'Parental Control' tab in the 'Services' screen. The 'Advanced Options' screen appears:

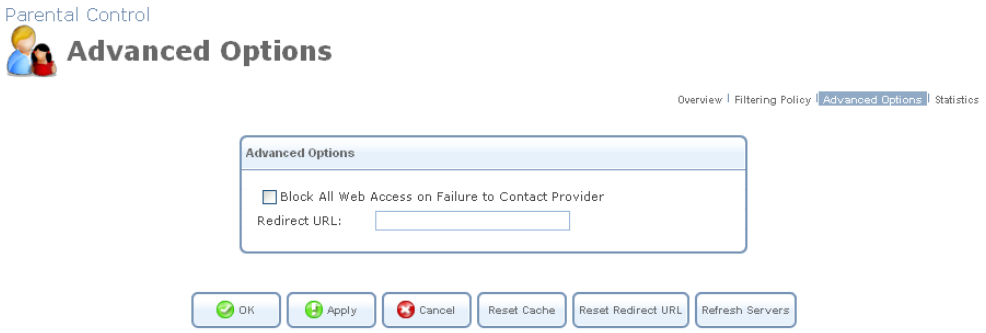


Figure 7.321. Advanced Options

Block All Web Access on Failure to Contact Provider The filtering service provider is consulted about every site's category in order to decide whether to allow or block it. If for any reason the provider cannot be consulted, use this check box to determine whether to block or allow access to all sites.

Redirect URL When a site is blocked, an OpenRG 'Blocked Access' page is displayed (see figure Figure 7.322), specifying the requested URL and the reason it was blocked. Use this field to specify an alternative page to be displayed when a site is blocked.

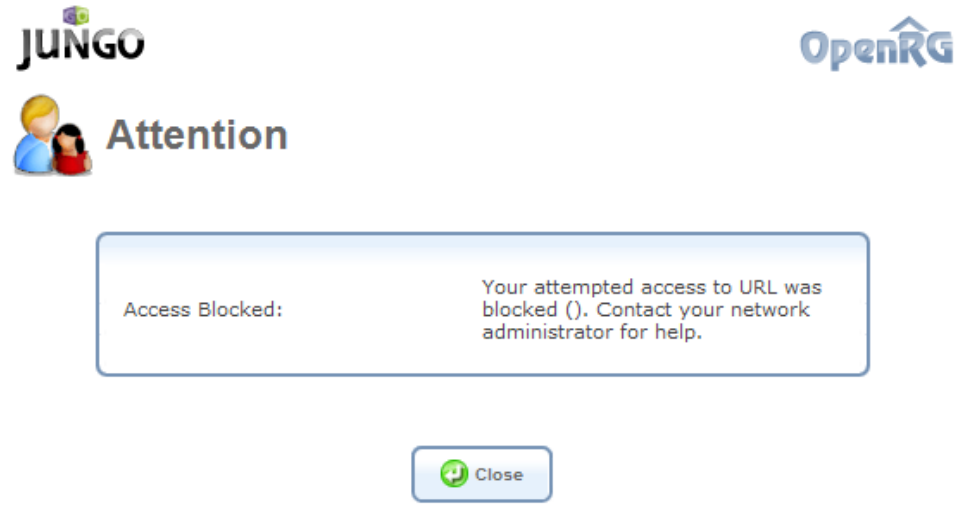


Figure 7.322. Blocked Access

7.8.4. Statistics

Click 'Statistics' under the 'Parental Control' tab in the 'Services' screen. The 'Statistics' screen appears:

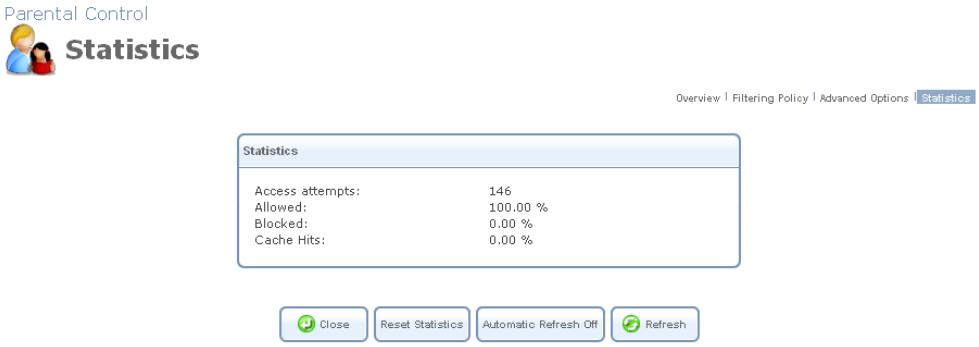


Figure 7.323. Statistics

The 'Statistics' screen monitors content filtering statistics. The statistics include a record of:

- Access attempts
- Allowed URLs
- Blocked URLs
- URLs that were accessed from Cache memory

Note: When Parental Control is enabled, HTTP services cannot be blocked by the 'Security Access Control' feature (see section Section 7.3.2).

7.9. Email Filtering

Email filtering is the processing of electronic mail according to specified criteria, and is most commonly used as Anti-Virus and Anti-Spam. OpenRG enables you to utilize an email filtering subscription on your gateway to control your email traffic and protect your network from malicious electronic messages. Every email message sent

to your gateway will first be verified by your email filtering server and handled according to your preferences. This feature greatly reduces potential harm to your network by eliminating sending and receiving unsolicited emails and computer viruses.

7.9.1. Overview

7.9.1.1. Activating Email Filtering

The first step in setting up email filtering on your network is obtaining such a subscription from an email filtering service provider. Currently OpenRG is provided with a connection to a demo server, for demonstration purposes.

1. Click the 'Email Filtering' tab in the 'Services' screen. The 'Email Filtering' screen appears, displaying the 'Overview' tab:

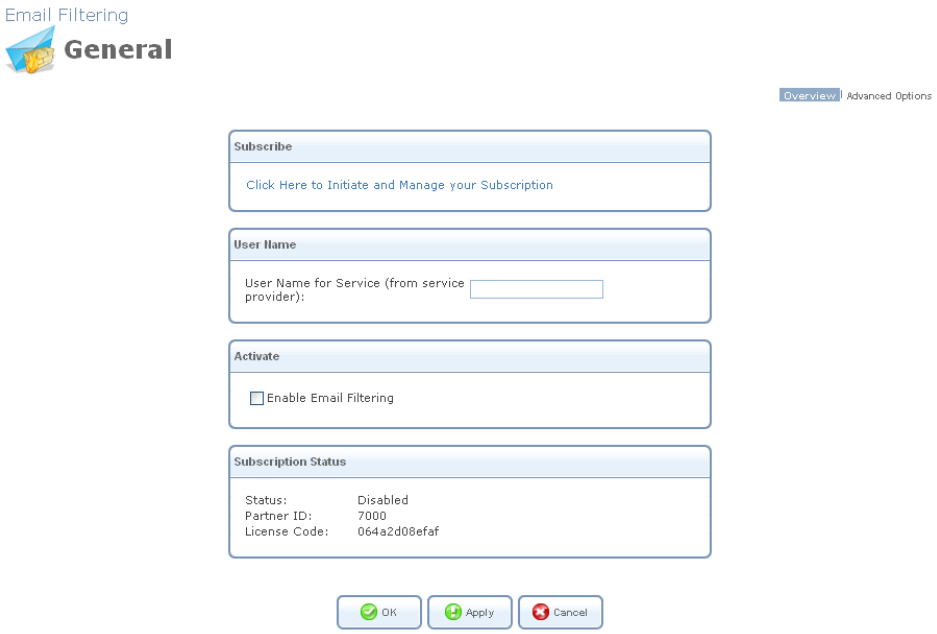


Figure 7.324. General

2. Click the 'Click Here to Initiate and Manage your Subscription' link in the 'Subscribe' section. The email filtering service provider's site will be displayed in a new browser window.

3. Follow the instructions on the site and subscribe or enroll for a free trial. You should receive a user name. The user name for OpenRG's demo server is "openrg".

To activate your email filtering subscription on your gateway, perform the following:

1. Click the 'Email Filtering' tab in the 'Services' screen. The 'Email Filtering' screen appears (see figure Figure 7.324).

2. Enter the user name provided by your email filtering service provider in the 'User Name' section. In this case, enter "openrg".

3. Select the 'Enable Email Filtering' check box in the 'Activate' section, and click 'Apply'. The screen will refresh, displaying additional 'POP3 Server Status' and 'SMTP Server Status' sections (see figure Figure 7.325). These sections list information on your incoming and outgoing mail servers, respectively. The 'Server Host' entry displays the IP address of the email filtering server. Note that the 'Status' entries (as well as the subscription status) should all indicate "OK". If this is not the case, press the 'Refresh' button. Wait a few seconds and repeat this step.

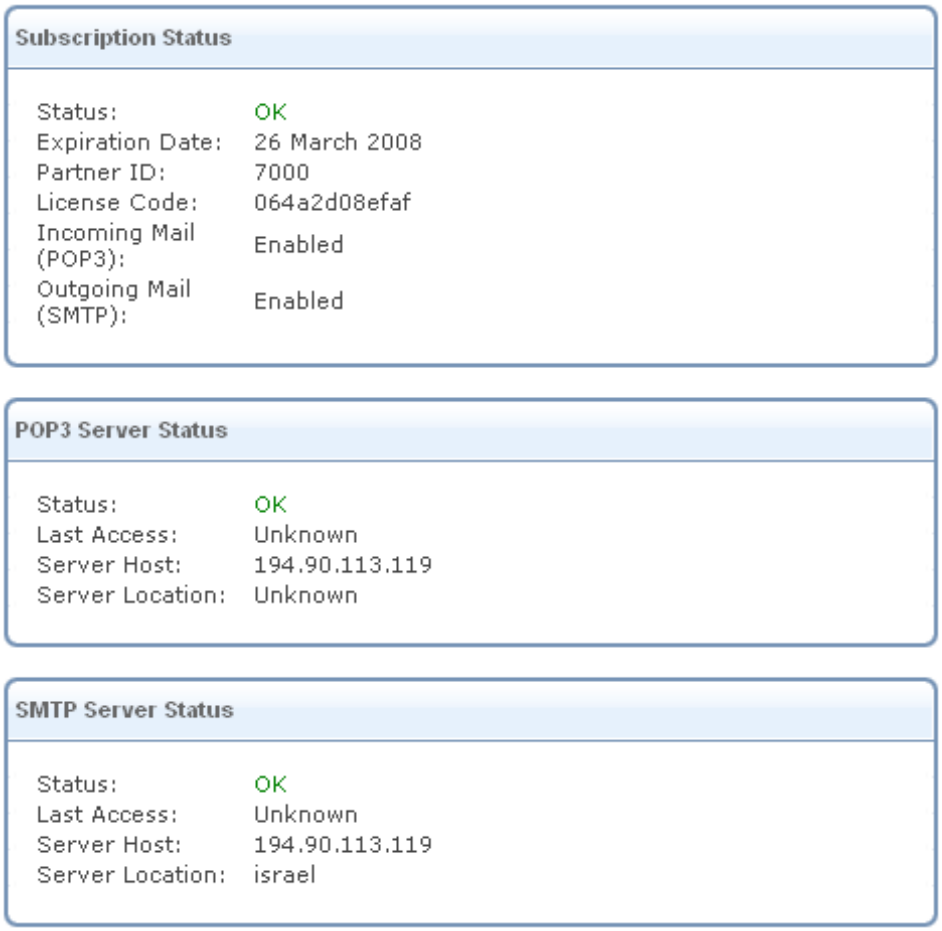


Figure 7.325. Email Filtering -- Activated

7.9.1.2. Using Email Filtering

Perform the following email filtering test:

1. Send an email from a WAN computer to a computer in OpenRG's LAN running a PC-based mail client such as Outlook OpenRG™ or Eudora OpenRG™ . Write the word "sexx" in the subject line of the message.

2. Check for the received message on the LAN computer. The message should arrive with the following subject: "*** Detected as Spam by POP3 spam keywords*** sexx". This is how the demo server is configured to handle spam of this sort. However, you may choose how to handle spam and other types of email messages by configuring your email filtering account.

3. Repeat the steps above, only this time deactivate email filtering by unselecting the 'Enable Email Filtering' check-box (see figure Figure 7.325). The message should arrive exactly as sent, as no filtering had been performed. Figure Figure 7.326 displays what your inbox should contain after the above test.

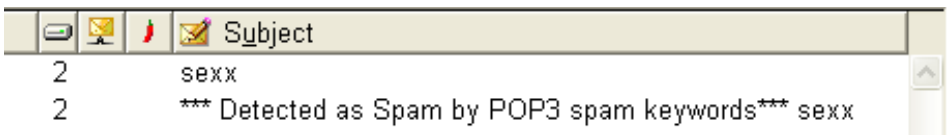


Figure 7.326. LAN Computer Inbox

7.9.2. Advanced Options

The 'Advanced Options' tab contains additional configuration parameters for incoming and outgoing mail.

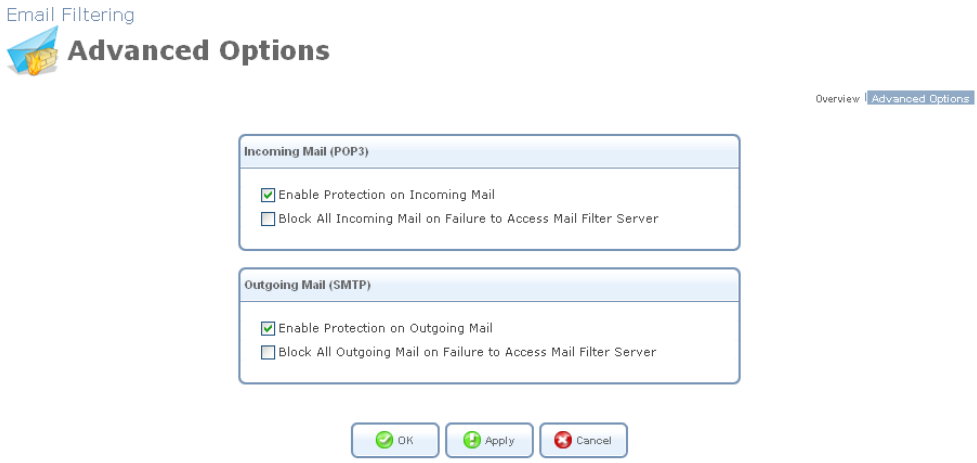


Figure 7.327. Advanced Options

- Incoming Mail (POP3)
  Enable Protection on Incoming Mail Email filtering rules will be applied on incoming mail. This option is enabled by default.

  Block All Incoming Mail on Failure to Access Mail Filter Server Select this option if you would like to block all incoming mail messages in case email filtering cannot be performed.

- Outgoing Mail (SMTP)
  Enable Protection on Outgoing Mail Email filtering rules will be applied on outgoing mail. This option is enabled by default.

  Block All Outgoing Mail on Failure to Access Mail Filter Server Select this option if you would like to block all outgoing mail messages in case email filtering cannot be performed.

7.10. Virtual Private Network

7.10.1. Internet Protocol Security

Internet Protocol Security (IPSec) is a series of guidelines for the protection of Internet Protocol (IP) communications. It specifies procedures for securing private information transmitted over public networks. The IPSec protocols include:

- AH (Authentication Header) provides packet-level authentication.
- ESP (Encapsulating Security Payload) provides encryption and authentication.
- IKE (Internet Key Exchange) negotiates connection parameters, including keys, for the other two services.

Services supported by the IPSec protocols (AH, ESP) include confidentiality (encryption), authenticity (proof of sender), integrity (detection of data tampering), and replay protection (defense against unauthorized resending of data). IPSec also specifies methodologies for key management. Internet Key Exchange (IKE), the IPSec key management protocol, defines a series of steps to establish keys for encrypting and decrypting information; it defines a common language on which communications between two parties is based. Developed by the Internet Engineering Task Force (IETF), IPSec and IKE together standardize the way data protection is performed, thus making it possible for security systems developed by different vendors to interoperate.

7.10.1.1. Technical Specifications

- Security architecture for the Internet Protocol
- IP Security Document Roadmap
- Connection type: Tunnel, Transport
- Use of Internet Security Association and Key Management Protocol (ISAKMP) in main and aggressive modes
- Key management: Manual, Automatic (Internet Key Exchange)
- NAT Traversal Negotiation for resolution of NATed tunnel endpoint scenarios
- Dead Peer Detection for tunnel disconnection in case the remote endpoint ceases to operate
- Gateway authentication: X.509, RSA signatures and pre-shared secret key
- IP protocols: ESP, AH
- Encryption: AES, 3DES, DES, NULL, HW encryption integration (platform dependent)
- Authentication: MD5, SHA-1
- IP Payload compression
- Interoperability: VPNC Certified IPSec, Windows 2000, Windows NT, FreeS/WAN, FreeBSD, Checkpoint Firewall-1, Safenet SoftRemote, NetScreen, SSH Sentinel

7.10.1.2. IPSec Settings

Access this feature either from the 'VPN' menu item under the 'Services' tab, or by clicking is icon in the 'Advanced' screen. The 'Internet Protocol Security (IPSec)' screen appears.

Figure 7.328. Internet Protocol Security (IPSec)

This screen enables you to configure:

Block Unauthorized IP Select the Enabled check-box to block unauthorized IP packets to OpenRG. Specify the following parameters:

Maximum Number of Authentication Failures The maximum number of packets to authenticate before blocking the origin's IP address.

Block Period (in seconds) The timeframe in which packets from an unauthorized IP address will be dropped.

Enable Anti-Replay Protection Select this option to enable dropping of packets that are recognized (by their sequence number) as already been received.

Connections This section will display the list of IPSec connections. To learn how to create an IPSec connection, refer to Section 8.4.14.

7.10.1.2.1. Public Key Management

The 'Settings' button in the 'Internet Protocol Security (IPSec)' screen enables you to manage OpenRG's public keys.

1. Press the 'Settings' button (see Figure 7.328) to view OpenRG's public key. If necessary, you can copy the public key from the screen that appears.

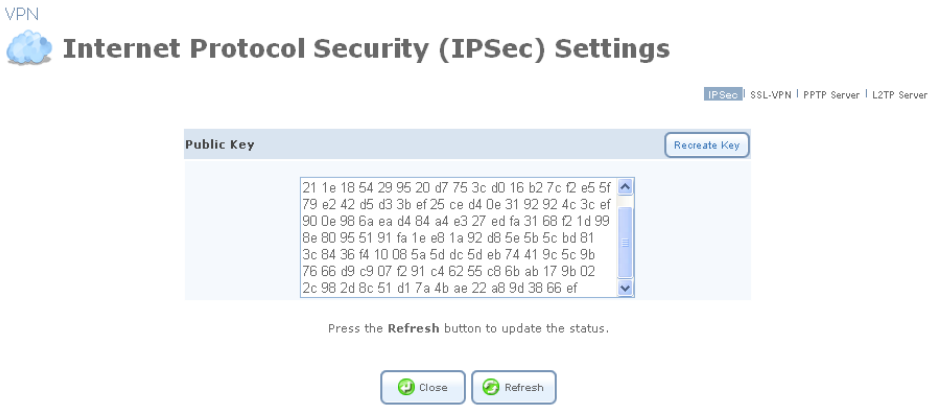

VPN
Internet Protocol Security (IPSec) Settings
IPSec | SSL-VPN | PPTP Server | L2TP Server
Public Key
Recreate Key
21 1e 18 54 29 95 20 d7 75 3c d0 16 b2 7c f2 e5 5f
79 e2 42 d5 d3 3b ef 25 ce d4 0e 31 92 92 4c 3c ef
90 0e 98 6a ea d4 84 a4 e3 27 ed fa 31 68 f2 1d 99
8e 80 95 51 91 fa 1e e8 1a 92 d8 5e 5b 5c bd 81
3c 84 36 f4 10 08 5a 5d dc 5d eb 74 41 9c 5c 9b
76 66 d9 c9 07 f2 91 c4 62 55 c8 6b ab 17 9b 02
2c 98 2d 8c 51 d1 7a 4b ae 22 a8 9d 38 66 ef
Press the Refresh button to update the status.
Close
Refresh

Figure 7.329. Internet Protocol Security (IPSec) Settings

2. Press the 'Recreate Key' button to recreate the pubic key, or the 'Refresh' button to refresh the key displayed in this screen.

7.10.1.2.2. Log Settings

The IPSec Log can be used to identify and analyze the history of the IPSec package commands, attempts to create connections, etc. IPSec activity, as well as that of other OpenRG modules, is displayed together in this view.

1. Press the 'Log Settings' button. The 'IPSec Log Settings' screen appears (see Figure 7.330).
2. Select the check boxes relevant to the information you would like the IPSec log to record.
3. Click 'OK' to save the settings.

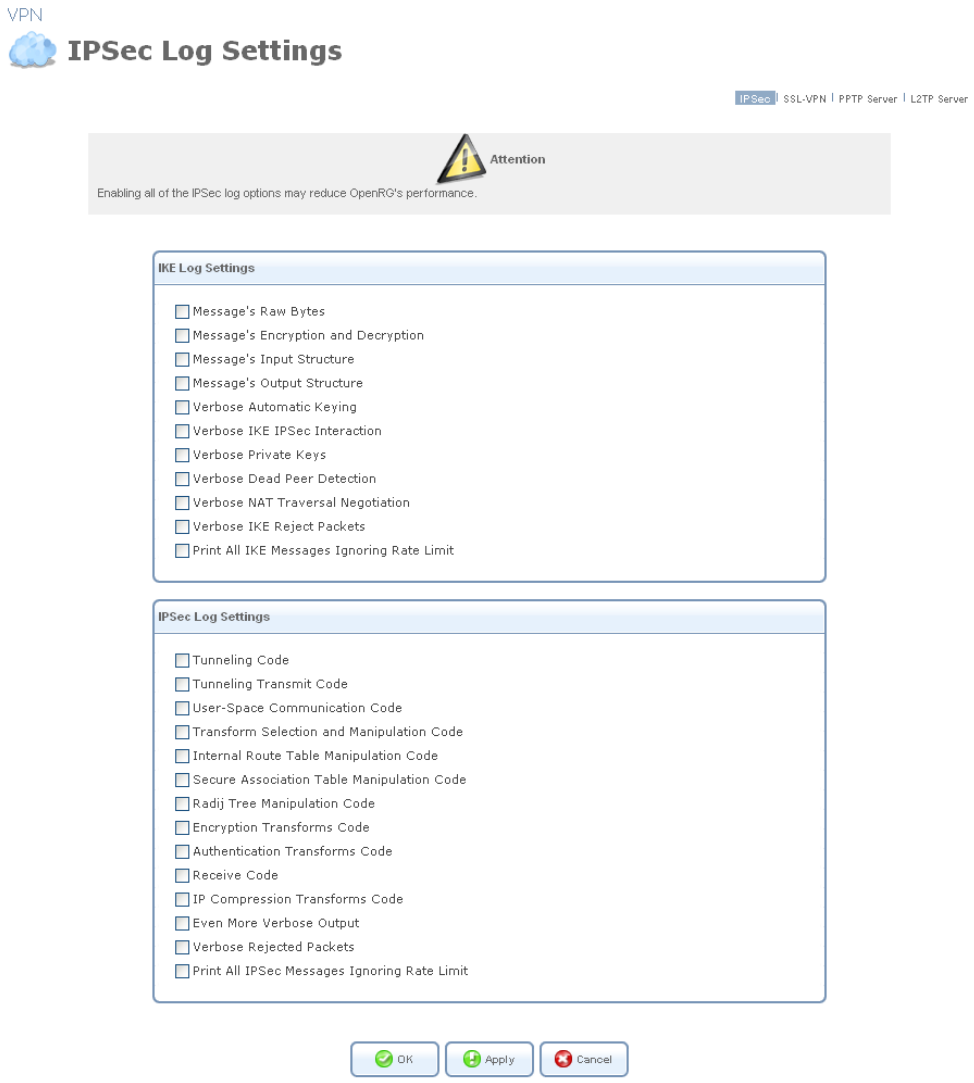


Figure 7.330. IPSec Log Settings

7.10.1.3. IPSec Connection Settings

The IPSec connections are displayed under the 'Connections' section of the 'Internet Protocol Security (IPSec)' screen (see Figure 7.328), in addition to the general 'Network Connections' screen (refer to Section 8.4). To configure an IPSec connection settings, perform the following:

1. Press the connection's action icon . The 'VPN IPSec Properties' screen appears, displaying the 'General' sub-tab.

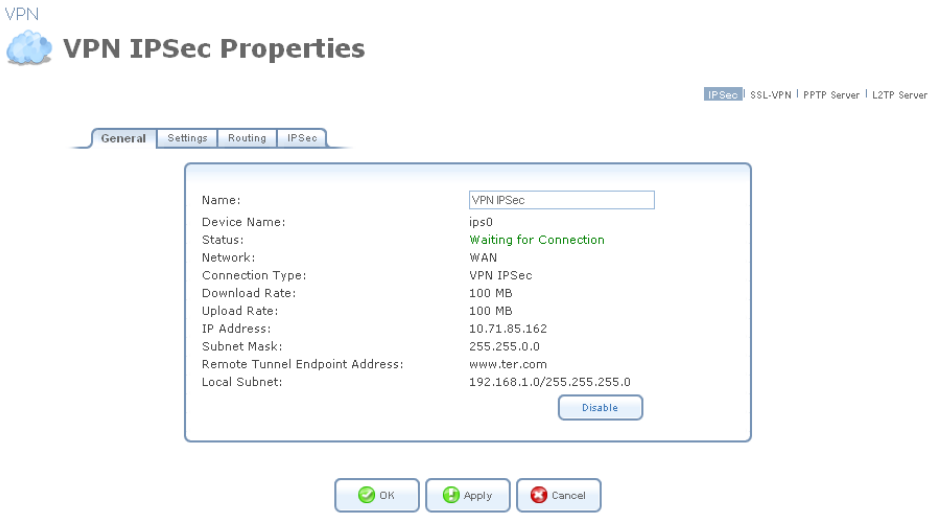


Figure 7.331. VPN IPSec Properties -- General

2. Press the 'Settings' sub-tab, and configure the following settings.

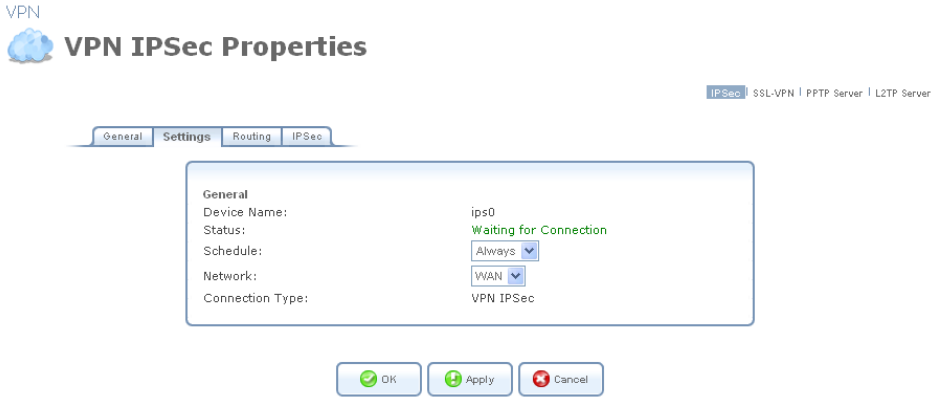


Figure 7.332. VPN IPSec Properties -- Settings

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

3. Press the 'Routing' sub-tab, and define the connection's routing rules. To learn how to create routing rules, refer to Section 8.6.1.

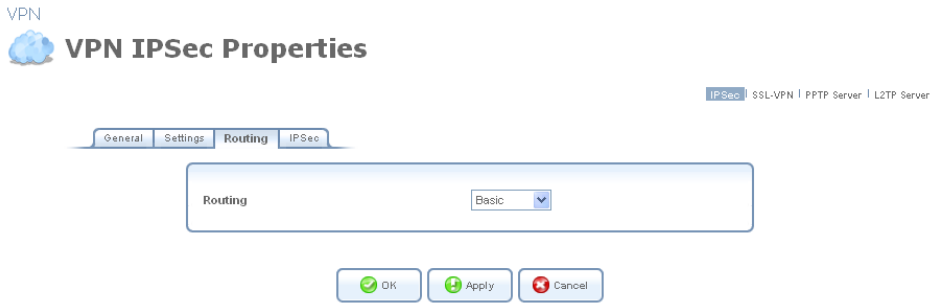


Figure 7.333. VPN IPSec Properties -- Routing

4. Press the 'IPSec' sub-tab, and configure the following settings.

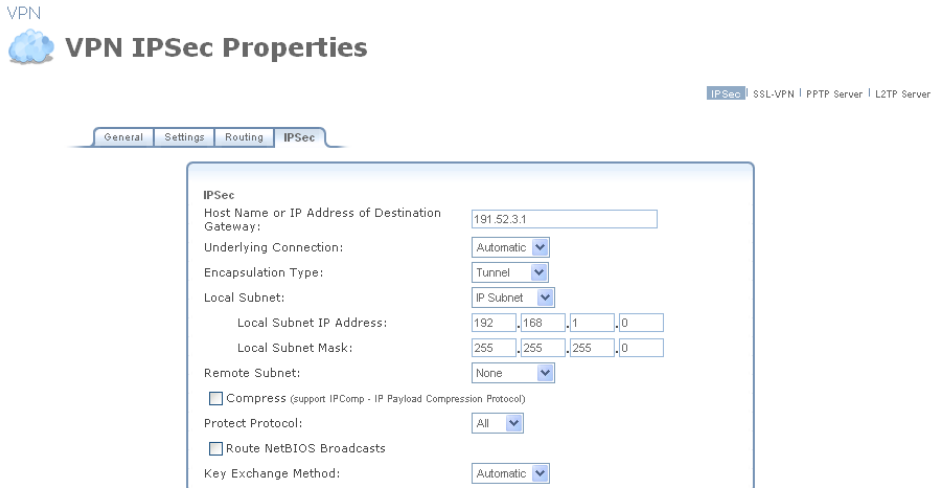


Figure 7.334. VPN IPSec Properties -- IPSec

Host Name or IP Address of Destination Gateway The IP address of your IPSec peer. If your connection is an IPSec Server, this field will display "Any Remote Gateway".

Underlying Connection In a single WAN scenario, the underlying connection parameter will be set to "Automatic" (non-configurable). However, if you have multiple WAN devices, a combo-box will appear (see figure Figure 7.332), enabling you to choose the underlying WAN device. The IPSec connection will only use your chosen device, unless failover is enabled. In this case, the failed-to device will be used instead (assuming its route rules consent), until the chosen device is up again. Note that if you select "Automatic", there will be no attempt to return to the original device from the failed-to device. For more information on failover, please refer to section Section 8.6.1.3.3.

Encapsulation Type Select between 'Tunneling' or 'Transport' encapsulation. 'Transport' encapsulation is performed between two gateways (no subnets), and therefore needs no explicit configuration. 'Tunneling' requires that you configure the following parameters:

Local Subnet Define your local endpoint, by selecting one of the following options:

- IP Subnet (default) -- enter OpenRG's Local Subnet IP Address and Local Subnet Mask.
- IP Range -- enter the 'From' and 'To' IP addresses, forming the endpoints range of the local subnet(s).
- IP Address -- enter the Local IP Address to define the endpoint as a single host.
- None -- select this option if you do not want to define a local endpoint. The endpoint will be set to the gateway.

Remote Subnet This section is identical to the 'Local Subnet' section above, but is for defining the remote endpoint.

Compress (Support IPComp protocol) Select this check-box to compress packets during encapsulation with the IP Payload Compression protocol. Please note that this reduces performance (and is therefore unchecked by default).

Protect Protocol Select the protocols to protect with IPSec: All, TCP, UDP, ICMP or GRE. When selecting TCP or UDP, additional source port and destination port combo-boxes will appear, enabling you to select 'All' or to specify 'Single' ports in order to define the protection of specific packets. For example, in order to protect L2TP packets, select UDP and specify 1701 as both single source and single destination ports.

Route NetBIOS Broadcasts Select this option to allow NetBIOS packets through the IPSec tunnel, which otherwise would not meet the routing conditions specified.

Key Exchange Method The IPSec key exchange method can be 'Automatic' (the default) or 'Manual'. Selecting one of these options will alter the rest of the screen.

1. Automatic key exchange settings:

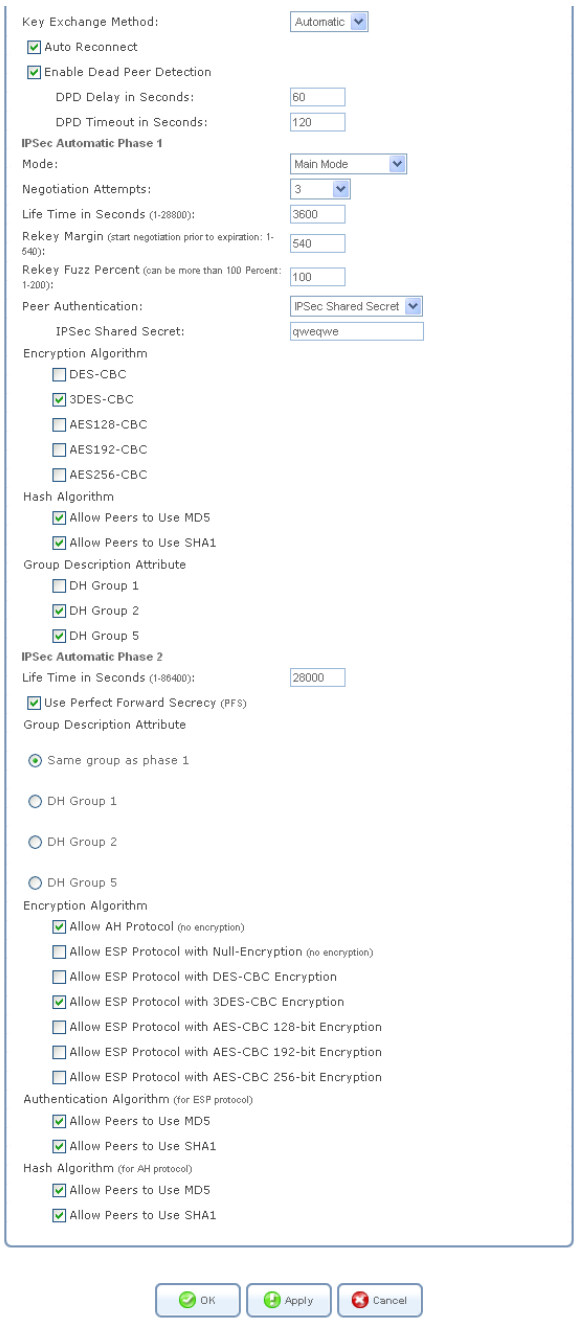

Key Exchange Method: Automatic
Auto Reconnect
Enable Dead Peer Detection
DPD Delay in Seconds: 60
DPD Timeout in Seconds: 120
IPSec Automatic Phase 1
Mode: Main Mode
Negotiation Attempts: 3
Life Time in Seconds (1-28800): 3600
Rekey Margin (start negotiation prior to expiration: 1-540): 540
Rekey Fuzz Percent (can be more than 100 Percent: 1-200): 100
Peer Authentication: IPSec Shared Secret
IPSec Shared Secret: qweqwe
Encryption Algorithm
DES-CBC
3DES-CBC
AES128-CBC
AES192-CBC
AES256-CBC
Hash Algorithm
Allow Peers to Use MD5
Allow Peers to Use SHA1
Group Description Attribute
DH Group 1
DH Group 2
DH Group 5
IPSec Automatic Phase 2
Life Time in Seconds (1-86400): 28000
Use Perfect Forward Secrecy (PFS)
Group Description Attribute
Same group as phase 1
DH Group 1
DH Group 2
DH Group 5
Encryption Algorithm
Allow AH Protocol (no encryption)
Allow ESP Protocol with Null-Encryption (no encryption)
Allow ESP Protocol with DES-CBC Encryption
Allow ESP Protocol with 3DES-CBC Encryption
Allow ESP Protocol with AES-CBC 128-bit Encryption
Allow ESP Protocol with AES-CBC 192-bit Encryption
Allow ESP Protocol with AES-CBC 256-bit Encryption
Authentication Algorithm (for ESP protocol)
Allow Peers to Use MD5
Allow Peers to Use SHA1
Hash Algorithm (for AH protocol)
Allow Peers to Use MD5
Allow Peers to Use SHA1
OK
Apply
Cancel

Figure 7.335. Automatic Key Exchange Settings

Auto Reconnect The IPSec connection will reconnect automatically if disconnected for any reason.

Enable Dead Peer Detection OpenRG will detect whether the tunnel endpoint has ceased to operate, in which case will terminate the connection. Note that this feature will be functional only if the other tunnel endpoint supports it. This is determined during the negotiation phase of the two endpoints.

DPD Delay in Seconds The timeframe in which no traffic has passed through the tunnel. After this timeframe, OpenRG will send a packet to test the tunnel endpoint, expecting a reply.

DPD Timeout in Seconds The timeframe OpenRG will wait for the test reply, after which it will terminate the connection.

IPSec Automatic Phase 1 -- Peer Authentication

Mode Select the IPSec mode -- either 'Main Mode' or 'Aggressive Mode'. Main mode is a secured but slower mode, which presents negotiable propositions according to the authentication algorithms that you select in the check-boxes. Aggressive Mode is faster but less secured. When selecting this mode, the algorithm check-boxes are replaced by radio buttons, presenting strict propositions according to your selections.

Negotiation attempts Select the number of negotiation attempts to be performed in the automatic key exchange method. If all attempts fail, OpenRG will wait for a negotiation request.

Life Time in Seconds The timeframe in which the peer authentication will be valid.

Rekey Margin Specifies how long before connection expiry should attempts to negotiate a replacement begin. It is similar to that of the key life time and is given as an integer denoting seconds.

Rekey Fuzz Percent Specifies the maximum percentage by which Rekey Margin should be randomly increased to randomize re-keying intervals.

Peer Authentication Select the method by which OpenRG will authenticate your IPSec peer:

- IPSec Shared secret -- enter the IPSec shared secret.
- RSA Signature -- enter the peer's RSA signature (equivalent to OpenRG's public key -- see section Section 7.10.1.2.1).
- Certificate -- if a certificate exists on OpenRG, it will appear when you select this option. Enter the certificate's local ID and peer ID. To learn how to add certificates to OpenRG, please refer to section Section 8.9.4 .

Encryption Algorithm Select the encryption algorithms that OpenRG will attempt to use when negotiating with the IPSec peer.

Hash Algorithm Select the hash algorithms that OpenRG will attempt to use when negotiating with the IPSec peer.

Group Description Attribute Select the Diffie-Hellman (DH) group description(s). Diffie-Hellman is a public-key cryptography scheme that allows two parties to establish a shared secret over an insecure communications channel.

IPSec Automatic Phase 2 -- Key Definition

Life Time in Seconds The length of time before a security association automatically performs renegotiation.

Use Perfect Forward Secrecy (PFS) Select whether Perfect Forward Secrecy of keys is required on the connection's keying channel (with PFS, penetration of the key-exchange protocol does not compromise keys negotiated earlier). Deselecting this option will hide the next parameter.

Group Description Attribute Select whether to use the same group chosen in phase 1, or reselect specific groups.

Encryption Algorithm Select the encryption algorithms that OpenRG will attempt to use when negotiating with the IPSec peer.

Authentication Algorithm (for ESP protocol) Select the authentication algorithms that OpenRG will attempt to use when negotiating with the IPSec peer.

Hash Algorithm (for AH protocol) Select the hash algorithms that OpenRG will attempt to use when negotiating with the IPSec peer.

2. Manual key definition:

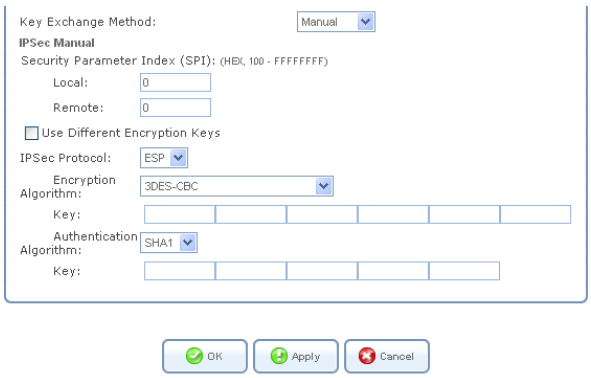


Figure 7.336. Manual Key Definition

Security Parameter Index (SPI): (HEX, 100 - FFFFFFFF) A 32 bit value that together with an IP address and a security protocol, uniquely identifies a particular security association. The local and remote values must be coordinated with their respective values on the IPSec peer.

Use Different Encryption Keys Selecting this option allows you to define both local and remote algorithm keys when defining the IPSec protocol (in the next section).

IPSec Protocol Select between the ESP and AH IPSec protocols. The screen will refresh accordingly:

- ESP -- Select the encryption and authentication algorithms, and enter the algorithm keys in hexadecimal representation.
- AH -- Select the hash algorithm, and enter the algorithm key in hexadecimal representation.

1. Click 'OK' to save the settings.

7.10.1.4. IPSec Gateway-to-Host Connection Scenario

In order to create an IPSec connection between OpenRG and a Windows host, you need to configure both the gateway and the host. This section describes both OpenRG's configuration and a Windows XP client configuration.

7.10.1.4.1. Configuring IPSec on OpenRG

1. Click the 'Network Connections' tab in the 'System' screen. The 'Network Connections' screen appears.

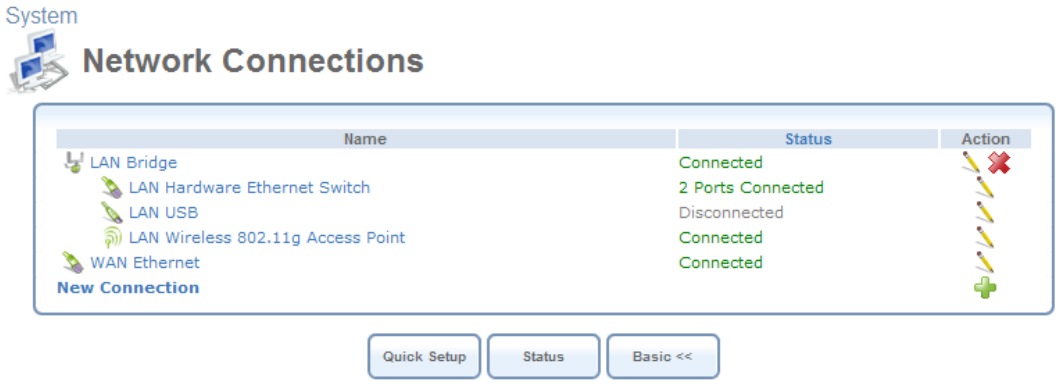


Figure 7.337. Network Connections

2. Click the 'New Connection' link. The 'Connection Wizard' screen appears.

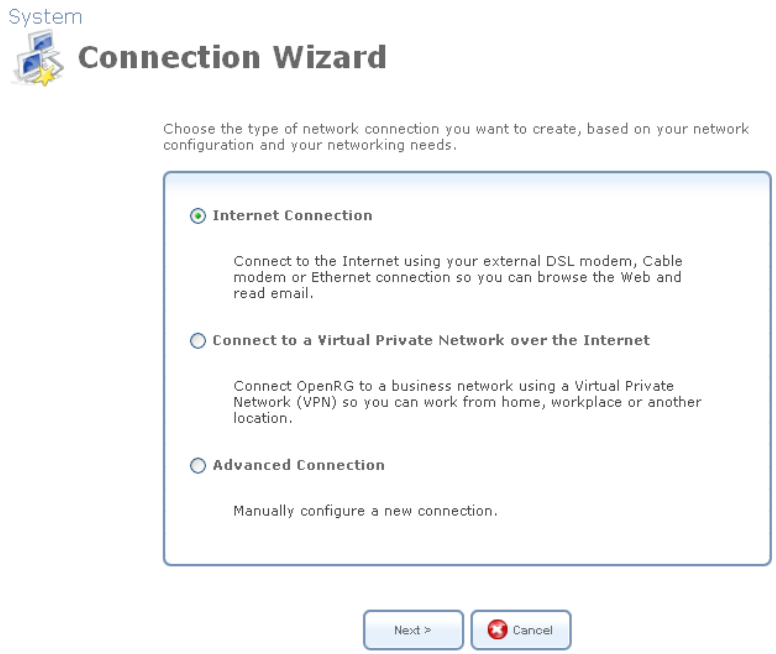

System
Connection Wizard
Choose the type of network connection you want to create, based on your network configuration and your networking needs.
Internet Connection
Connect to the Internet using your external DSL modem, Cable modem or Ethernet connection so you can browse the Web and read email.
Connect to a Virtual Private Network over the Internet
Connect OpenRG to a business network using a Virtual Private Network (VPN) so you can work from home, workplace or another location.
Advanced Connection
Manually configure a new connection.
Next >
Cancel

Figure 7.338. Connection Wizard

3. Select the 'Connect to a Virtual Private Network over the Internet' radio button and click 'Next'. The 'Connect to a Virtual Private Network over the Internet' screen appears.

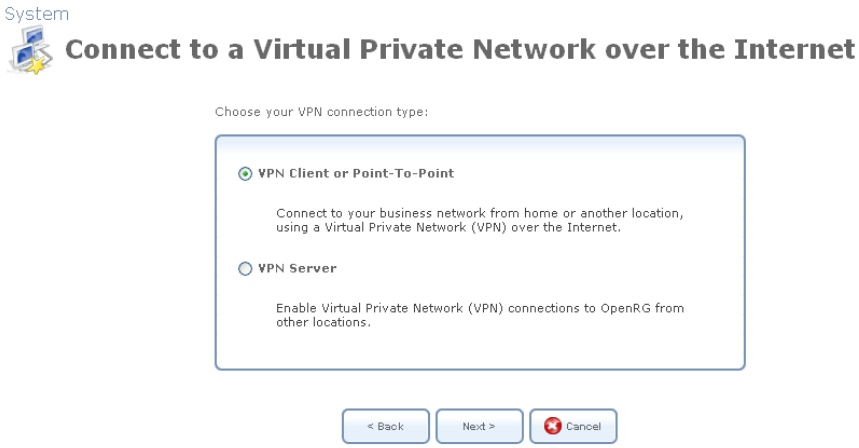

System
Connect to a Virtual Private Network over the Internet
Choose your VPN connection type:
VPN Client or Point-To-Point
Connect to your business network from home or another location, using a Virtual Private Network (VPN) over the Internet.
VPN Server
Enable Virtual Private Network (VPN) connections to OpenRG from other locations.
< Back
Next >
Cancel

Figure 7.339. Connect to a Virtual Private Network over the Internet

4. Select the 'VPN Client or Point-To-Point' radio button and click 'Next'. The 'VPN Client or Point-To-Point' screen appears.

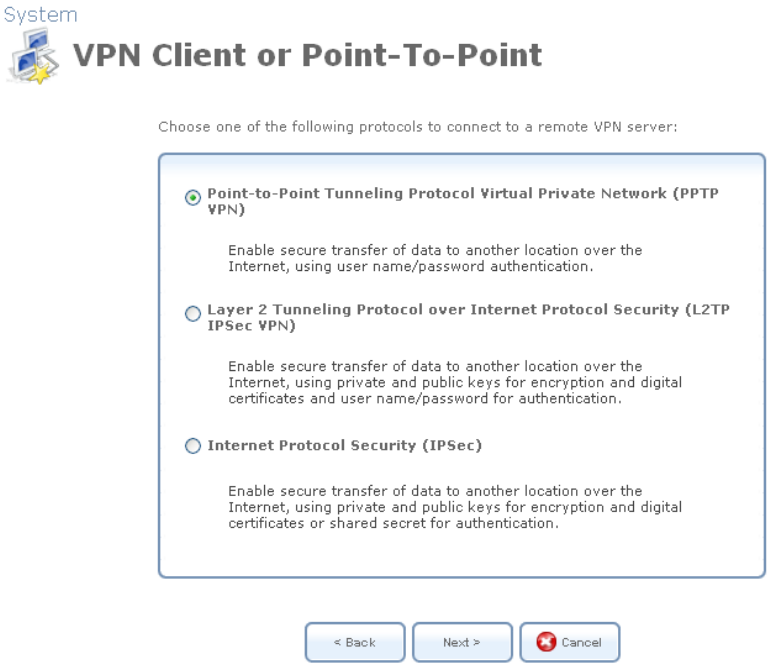

System
VPN Client or Point-To-Point
Choose one of the following protocols to connect to a remote VPN server:
Point-to-Point Tunneling Protocol Virtual Private Network (PPTP VPN)
Enable secure transfer of data to another location over the Internet, using user name/password authentication.
Layer 2 Tunneling Protocol over Internet Protocol Security (L2TP IPSec VPN)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates and user name/password for authentication.
Internet Protocol Security (IPSec)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates or shared secret for authentication.
< Back
Next >
Cancel

Figure 7.340. VPN Client or Point-To-Point

5. Select the 'Internet Protocol Security (IPSec)' radio button and click 'Next'. The 'Internet Protocol Security (IPSec)' screen appears.

Figure 7.341. Internet Protocol Security (IPSec)

1. Specify the following parameters:
   Host Name or IP Address of Destination Gateway Specify 22.23.24.25

   Remote IP Select "Same as Gateway".

   Encapsulation Type Select "Tunnel".

   Shared Secret Specify "hr5x".

1. Click 'Next', the 'Connection Summary' screen appears:

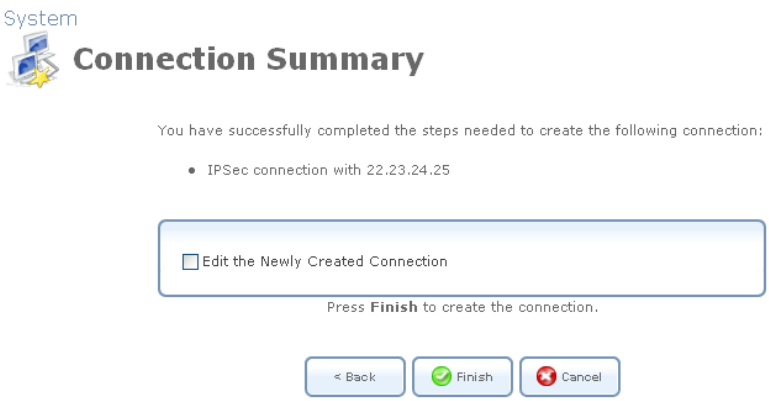


Figure 7.342. Connection Summary

2. Click 'Finish'. The 'Network Connections' screen now lists the newly created IPSec connection:

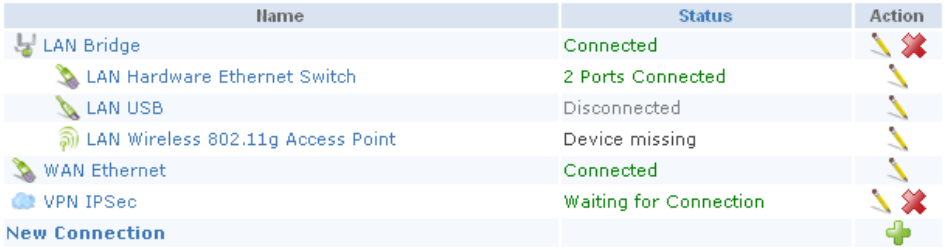


Figure 7.343. New VPN IPSec Connection

7.10.1.4.2. Configuring IPSec on the Windows Host

The following IP addresses are needed for the host configuration:

- Windows IP address - referred to as <windows_ip>.
- OpenRG WAN IP address - referred to as <openrg_wan_ip>.
- OpenRG LAN Subnet address - referred to as <openrg_lan_subnet>.

The configuration sequence:

1. The first step is to create the IPSec Policy:
    1. Click the Start button and select Run. Type "secpol.msc" and click 'OK'. The 'Local Security Settings' window will appear (see figure Figure 7.344).

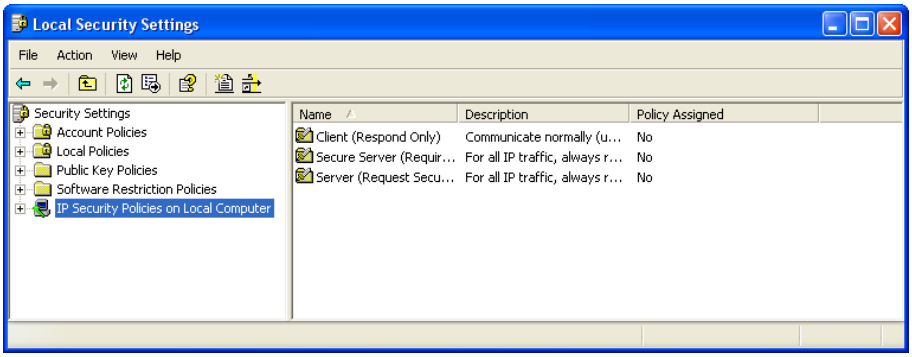


Figure 7.344. Local Security Settings

2. Right-click the 'IP Security Policies on Local Computer' and choose 'Create IP Security Policy...'. The IP Security Policy Wizard will appear (see figure Figure 7.345).

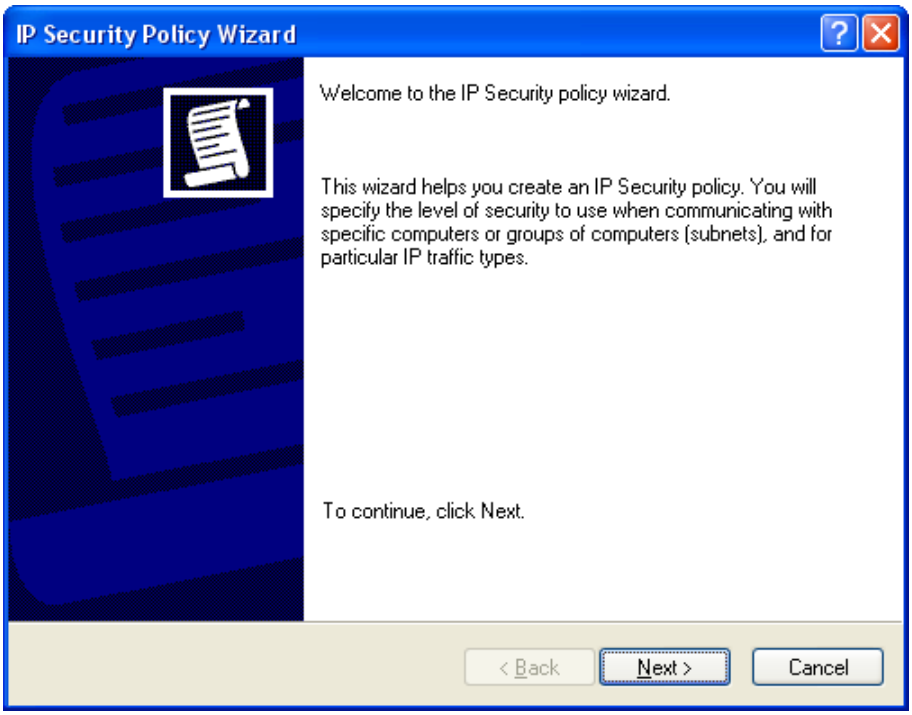

IP Security Policy Wizard
Welcome to the IP Security policy wizard.
This wizard helps you create an IP Security policy. You will specify the level of security to use when communicating with specific computers or groups of computers (subnets), and for particular IP traffic types.
To continue, click Next.
< Back
Next >
Cancel

Figure 7.345. IP Security Policy Wizard

3. Click 'Next' and type a name for your policy, for example "OpenRG Connection" (see figure Figure 7.346). Click 'Next'.

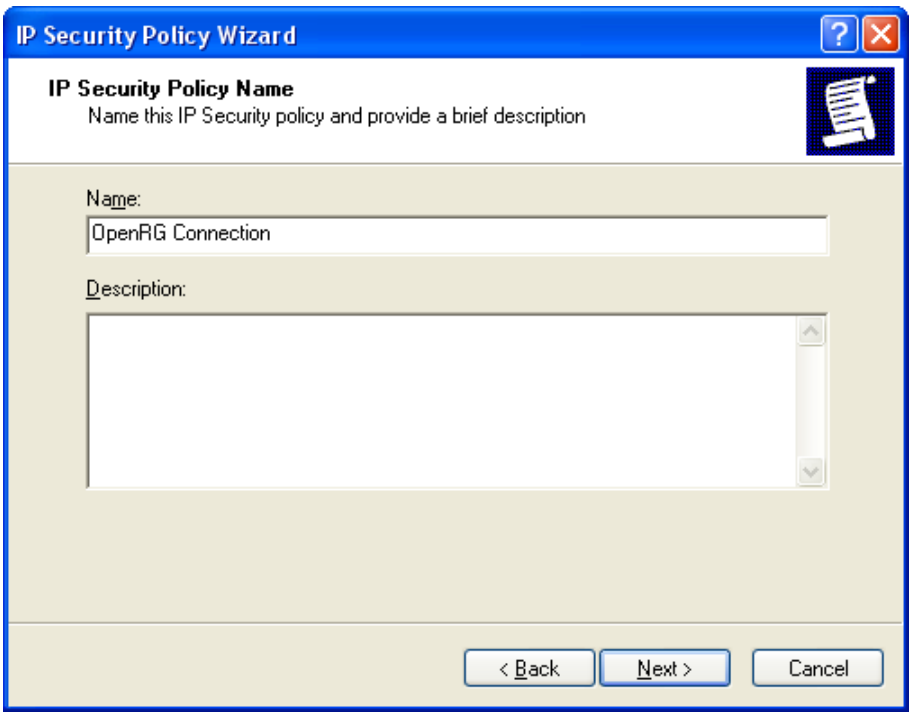


Figure 7.346. IP Security Policy Name

4. Deselect the 'Activate the default response rule' check box (see figure Figure 7.347) and click 'Next'.

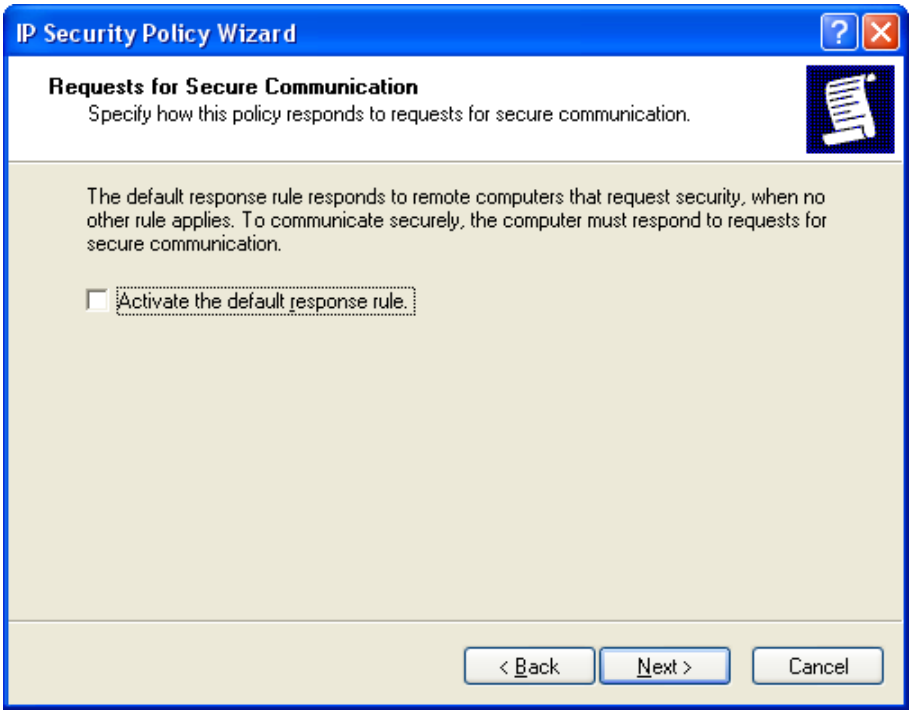

IP Security Policy Wizard
Requests for Secure Communication
Specify how this policy responds to requests for secure communication.
The default response rule responds to remote computers that request security, when no other rule applies. To communicate securely, the computer must respond to requests for secure communication.
Activate the default response rule.
< Back
Next >
Cancel

Figure 7.347. Requests for Secure Communication

5. Make sure that the 'Edit Properties' check box is checked (see figure Figure 7.348) and click the Finish button.

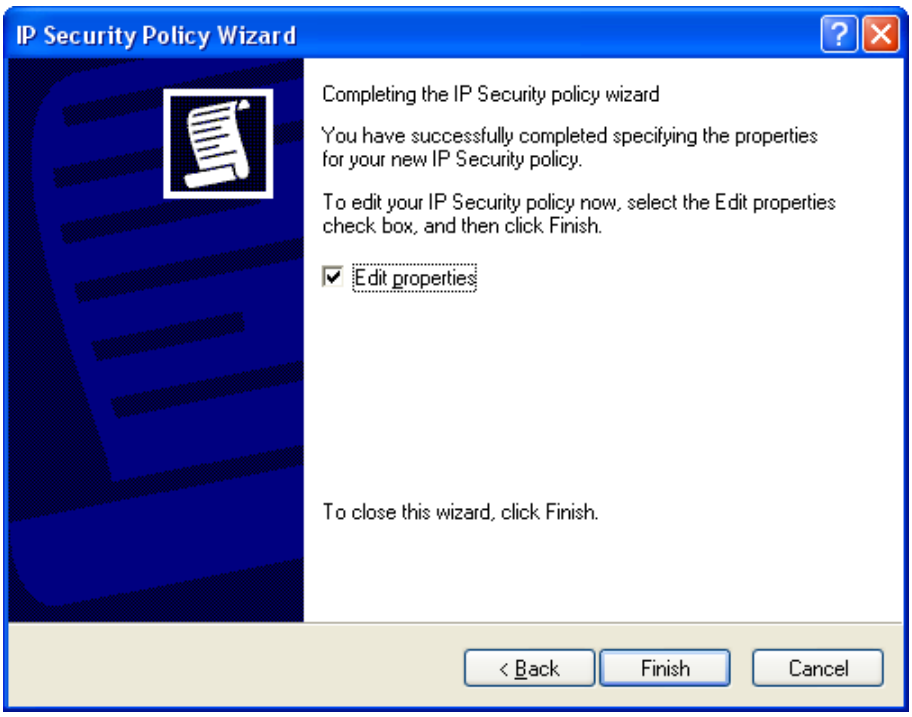

IP Security Policy Wizard
Completing the IP Security policy wizard
You have successfully completed specifying the properties for your new IP Security policy.
To edit your IP Security policy now, select the Edit properties check box, and then click Finish.
Edit properties
To close this wizard, click Finish.
< Back
Finish
Cancel

Figure 7.348. Completing the IP Security Policy Wizard

6. On the 'OpenRG Connection Properties' window that will appear (see figure Figure 7.349), click 'OK'.

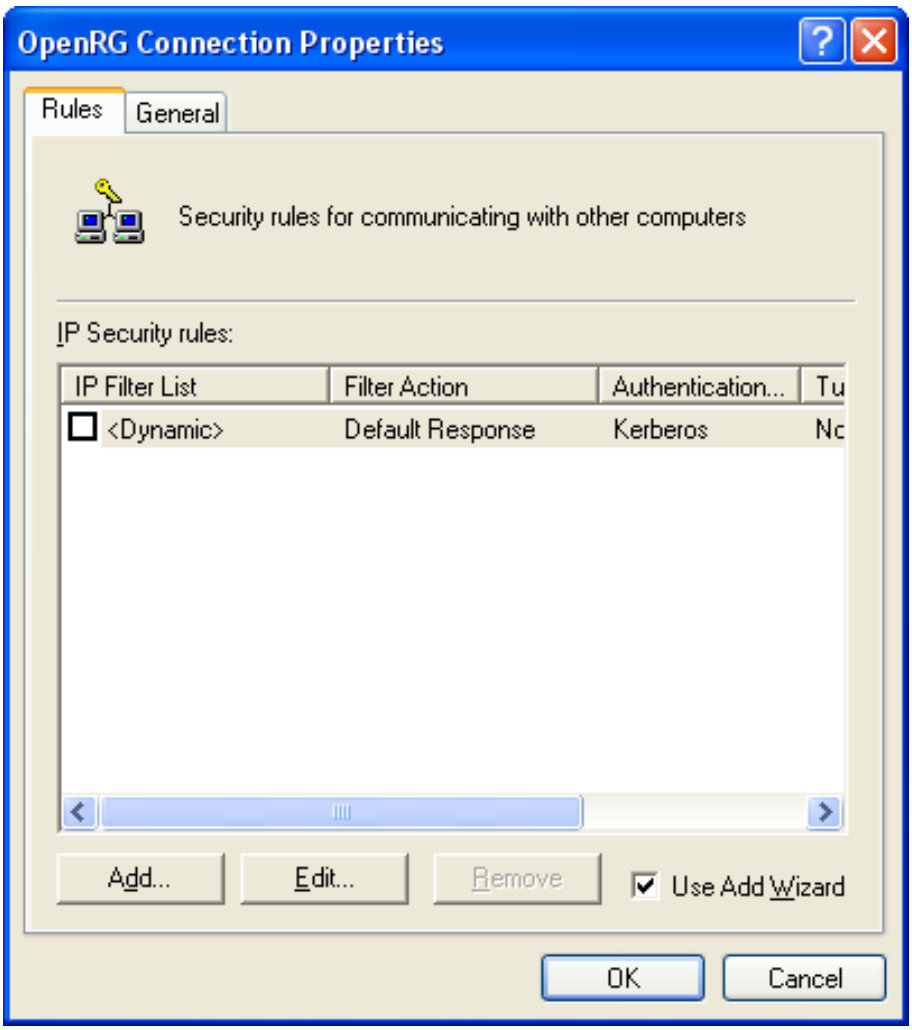


Figure 7.349. OpenRG Connection Properties

2. Building Filter List 1 - Windows XP to OpenRG:

    1. In the 'Local Security Settings' window, right-click the new 'OpenRG Connection' policy, created in the previous step, and select Properties. The Properties window will appear (see figure Figure 7.349).

    2. Deselect the 'Use Add Wizard' check box and click the 'Add' button to create a new IP Security rule. The 'New Rule Properties' window will appear (see figure Figure 7.350).

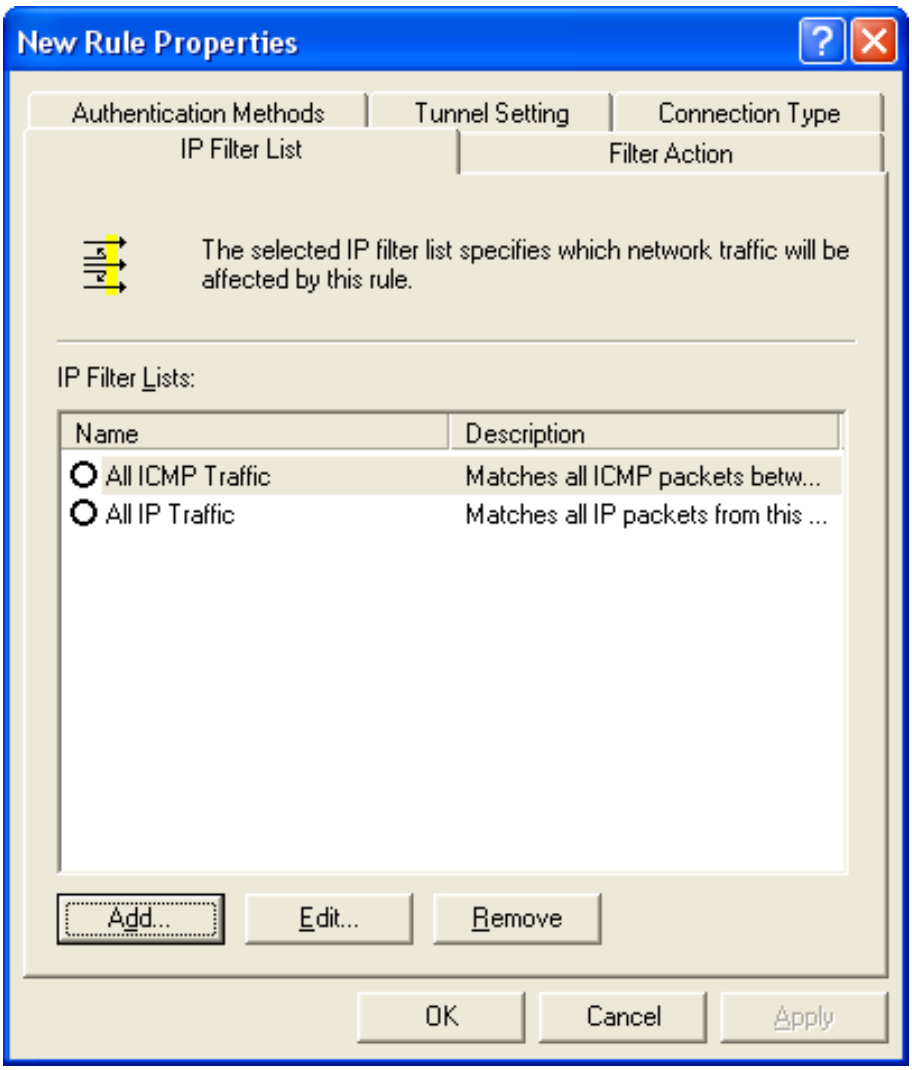


Figure 7.350. New Rule Properties

3. Under the IP Filter List tab, click the 'Add' button. The 'IP Filter List' window will appear (see figure Figure 7.351).

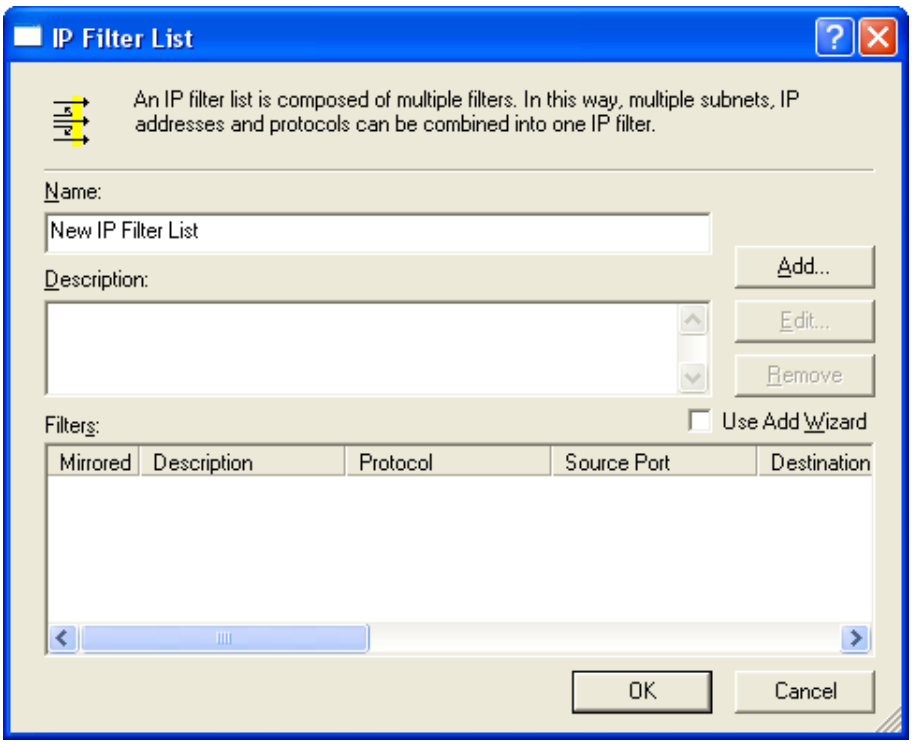


Figure 7.351. IP Filter List

4. Enter the name "Windows XP to OpenRG" for the filter list, deselect the 'Use Add Wizard' check box, and click the 'Add' button. The 'Filter Properties' window will appear (see figure Figure 7.352).

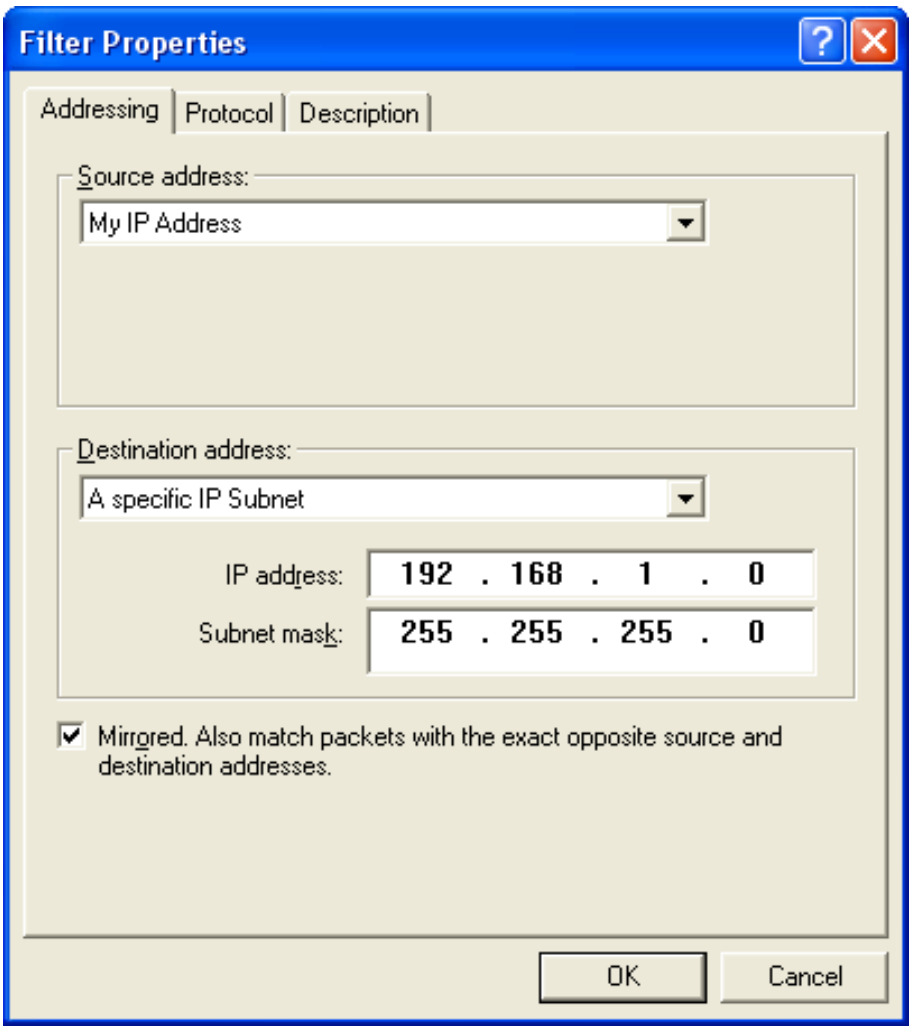


Figure 7.352. Filter Properties

5. In the 'Source address' combo box, select 'My IP Address'.

6. In the 'Destination address' combo box, select 'A Specific IP Subnet'. In the 'IP Address' field enter the LAN Subnet (<openrg_lan_subnet>), and in the 'Subnet mask' field enter 255.255.255.0.

7. Click the Description tab if you would like to enter a description for your filter.

8. Click the 'OK' button. Click 'OK' again in the 'IP Filter List' window to save the settings.

3. Building Filter List 2 - OpenRG to Windows XP:

   1. Under the IP Filter List tab of the 'New Rule Properties' window, click the 'Add' button. The 'IP Filter List' window will appear (see figure Figure 7.351).

   2. Enter the name "OpenRG to Windows XP" for the filter list, deselect the 'Use Add Wizard' check box, and click the 'Add' button. The 'Filter Properties' window will appear (see figure Figure 7.353).

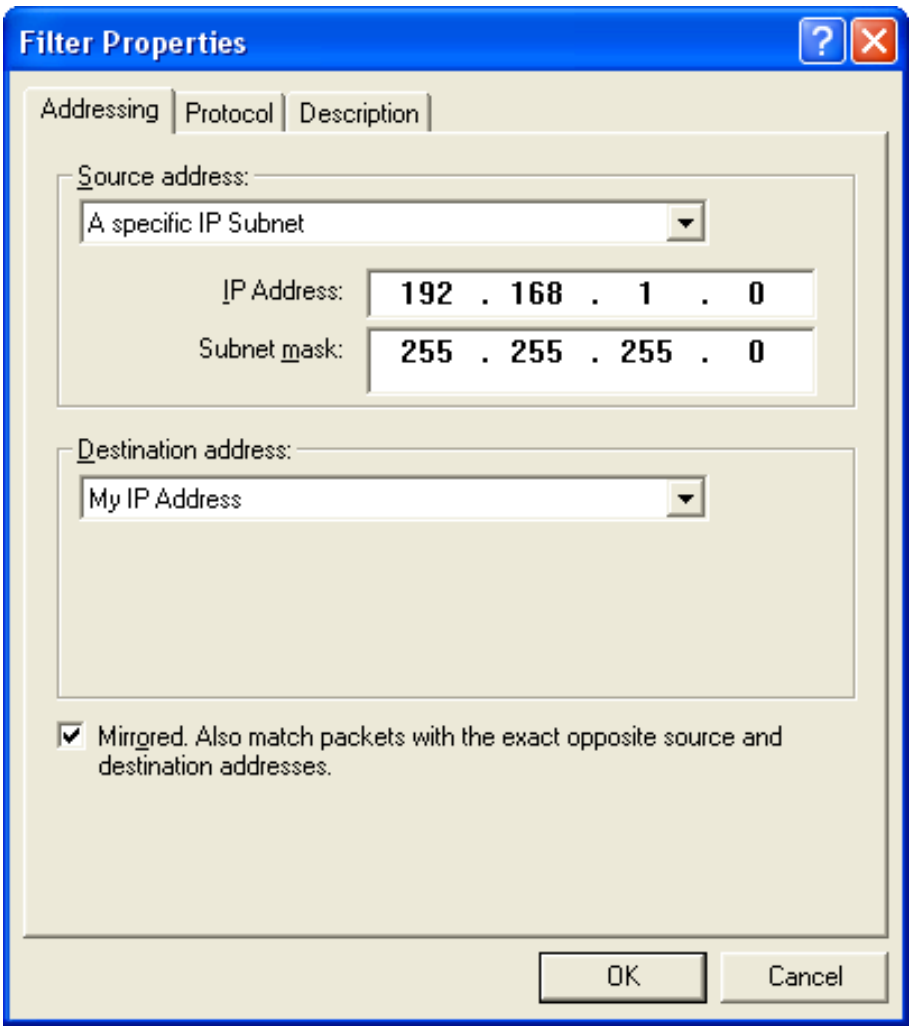


Figure 7.353. Filter Properties

3. In the 'Source address' combo box, select 'A Specific IP Subnet'. In the 'IP Address' field enter the LAN Subnet (<openrg_lan_subnet>), and in the 'Subnet mask' field enter 255.255.255.0.

4. In the 'Destination address' combo box, select 'My IP Address'.

5. Click the Description tab if you would like to enter a description for your filter.

6. Click the 'OK' button. Click 'OK' again in the 'IP Filter List' window to save the settings.

4. Configuring Individual Rule of Tunnel 1 (Windows XP to OpenRG):

1. Under the 'IP Filter List' tab of the 'New Rule Properties' window, select the 'Windows XP to OpenRG' radio button (see figure Figure 7.354).

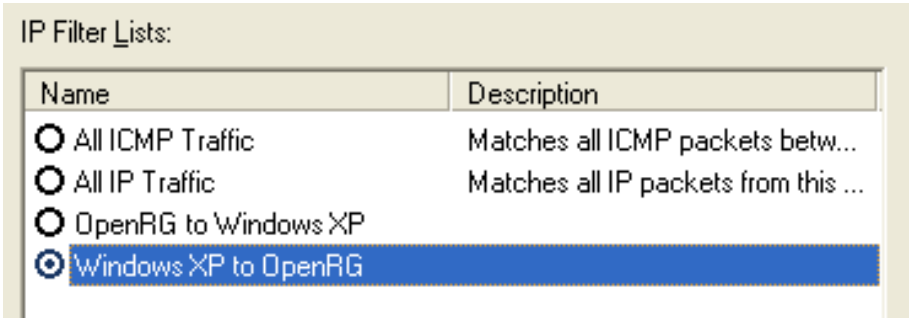


Figure 7.354. IP Filter List

2. Click the 'Filter Action' tab (see figure Figure 7.355).

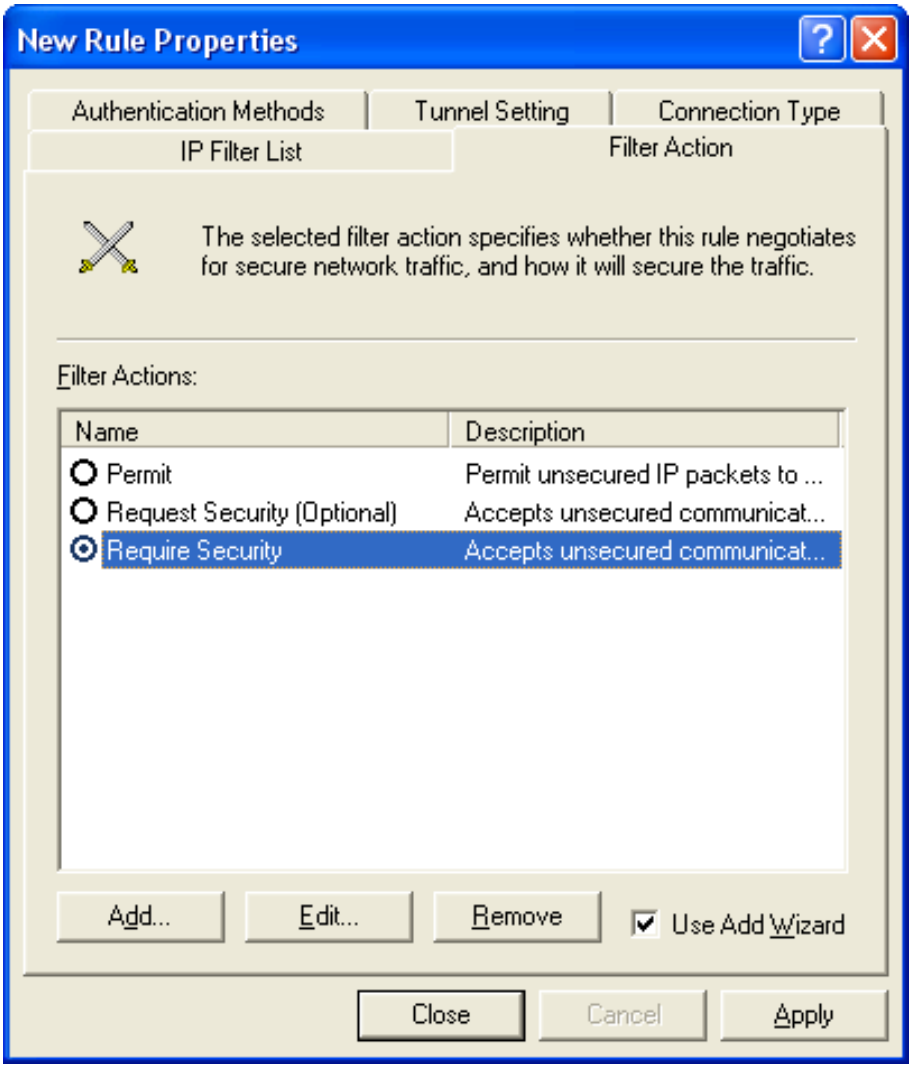


Figure 7.355. Filter Action

3. Select the 'Require Security' radio button, and click the 'Edit' button. The 'Require Security Properties' window will appear (see figure Figure 7.356).

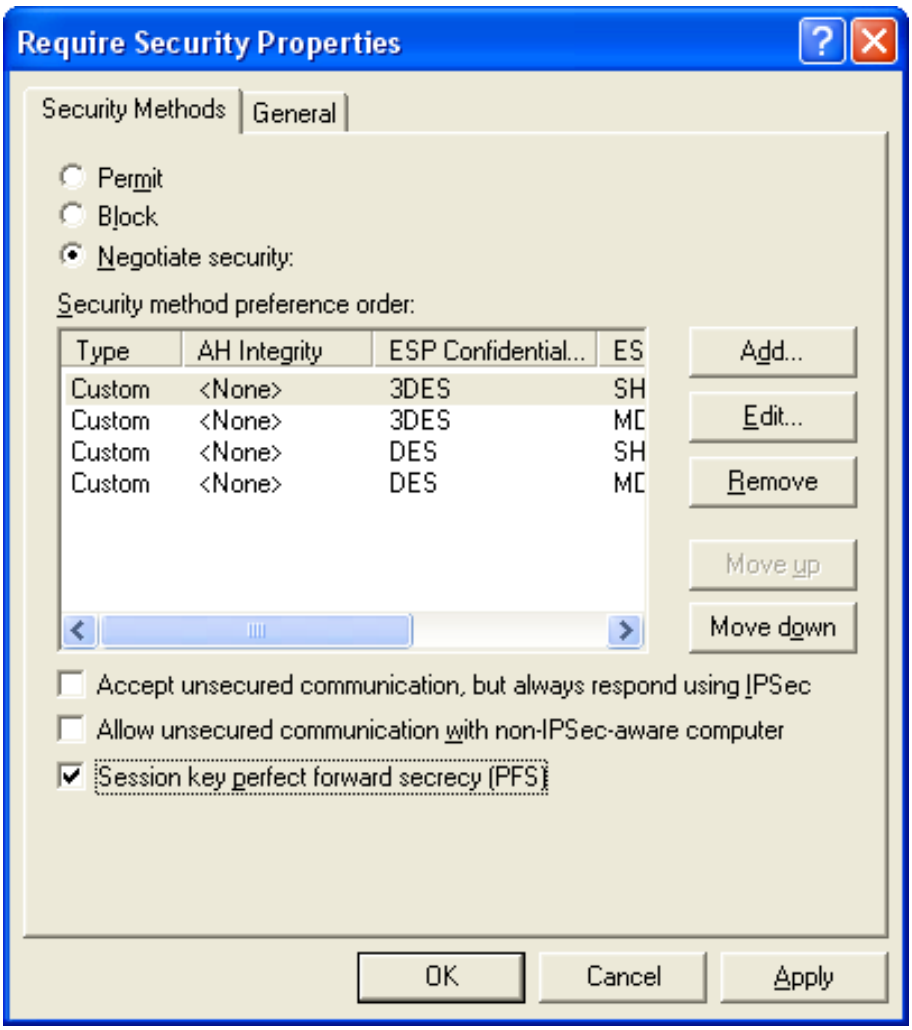


Figure 7.356. Require Security Properties

4. Verify that the 'Negotiate security' option is enabled, and deselect the 'Accept unsecured communication, but always respond using IPSec' check box. Select the 'Session key Perfect Forward Secrecy (PFS)' (the PFS option must be enabled on OpenRG), and click the OK button.

5. Under the 'Authentication Methods' tab, click the Edit button. The 'Edit Authentication Method Properties' window will appear (see figure Figure 7.357).

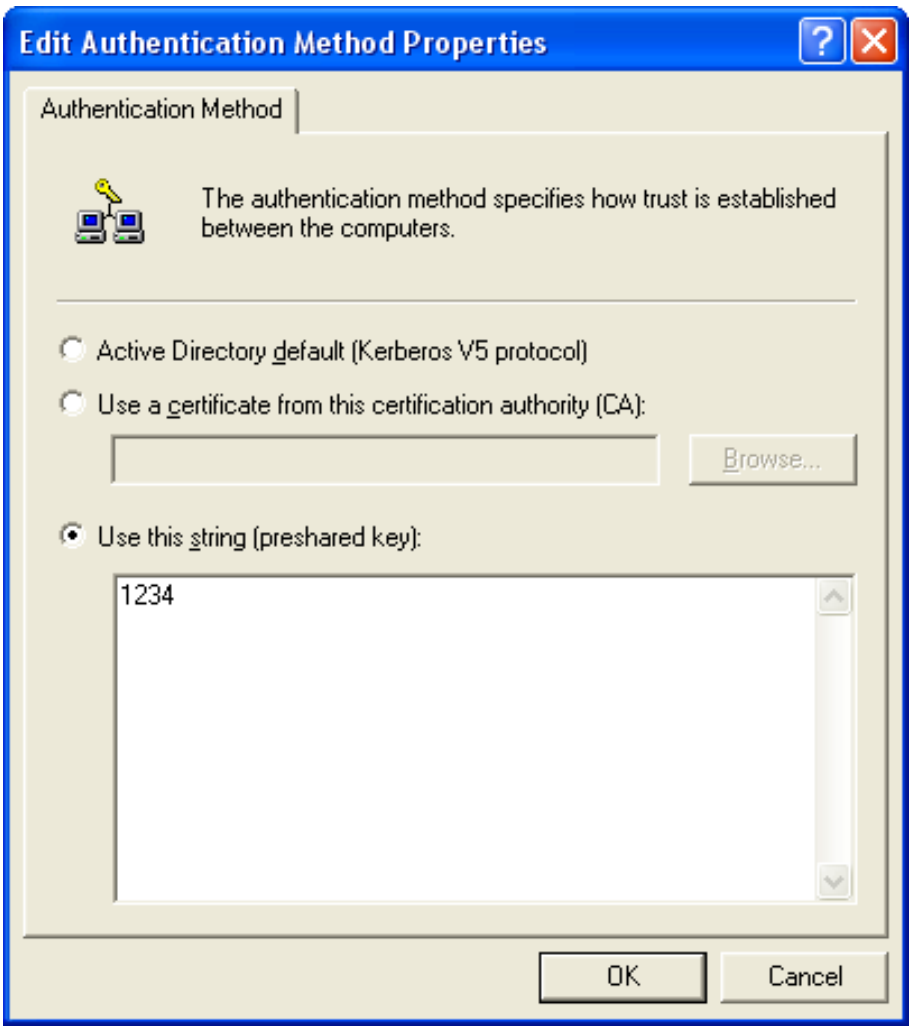

Edit Authentication Method Properties
Authentication Method
The authentication method specifies how trust is established between the computers.
Active Directory default (Kerberos V5 protocol)
Use a certificate from this certification authority (CA):
Browse...
Use this string (preshared key):
1234
OK
Cancel

Figure 7.357. Edit Authentication Method Properties

6. Select the 'Use this string (preshared key)' radio button, and enter a string that will be used as the key (for example, 1234). Click the 'OK' button.

7. Under the 'Tunnel Setting' tab, select the 'The tunnel endpoint is specified by this IP Address' radio button, and enter <openrg_wan_ip> (see figure Figure 7.358).

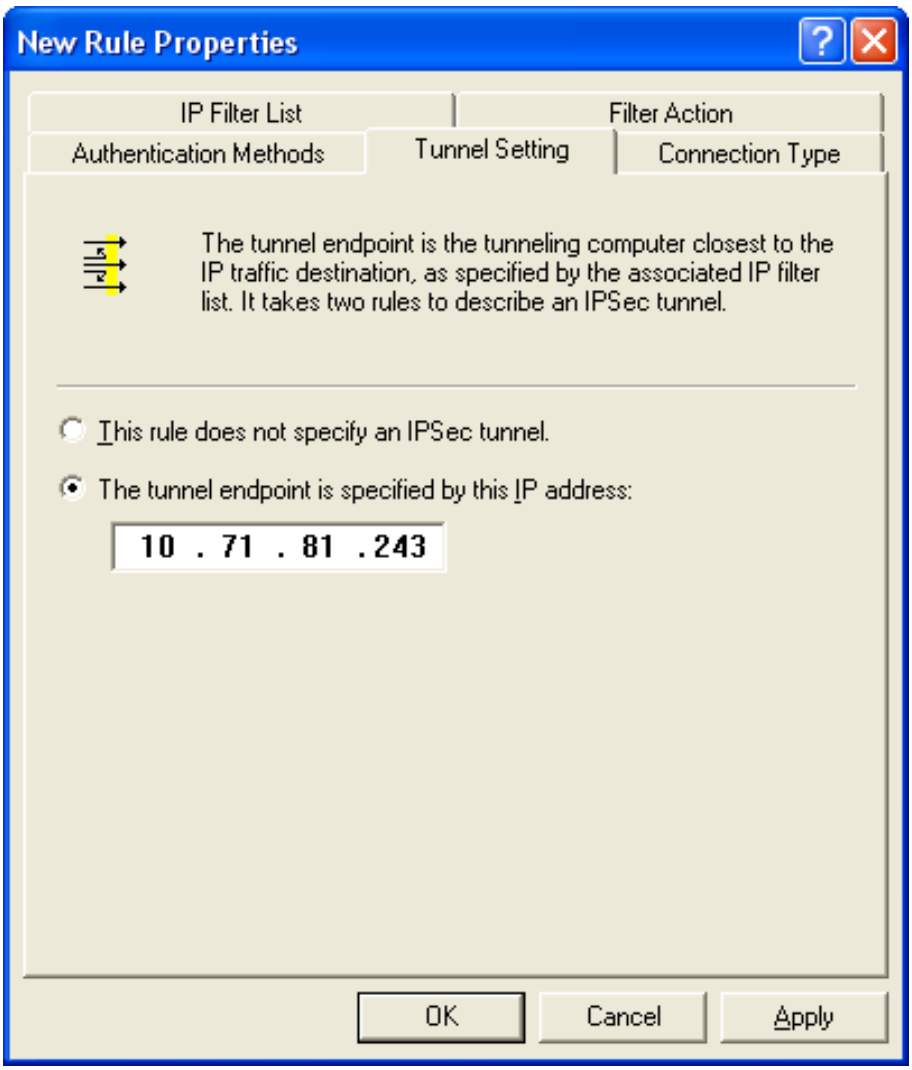

New Rule Properties
IP Filter List
Filter Action
Authentication Methods
Tunnel Setting
Connection Type
The tunnel endpoint is the tunneling computer closest to the IP traffic destination, as specified by the associated IP filter list. It takes two rules to describe an IPSec tunnel.
This rule does not specify an IPSec tunnel.
The tunnel endpoint is specified by this IP address:
10 . 71 . 81 .243
OK
Cancel
Apply

Figure 7.358. Tunnel Setting

8. Under the 'Connection Type' tab, verify that 'All network connections' is selected.

9. Click the 'Apply' button and then click the 'OK' button to save this rule.

5. Configuring Individual Rule of Tunnel 2 (OpenRG to Windows XP):

   1. Under the 'IP Filter List' tab of the 'New Rule Properties' window, select the 'OpenRG to Windows XP' radio button (see figure Figure 7.359).

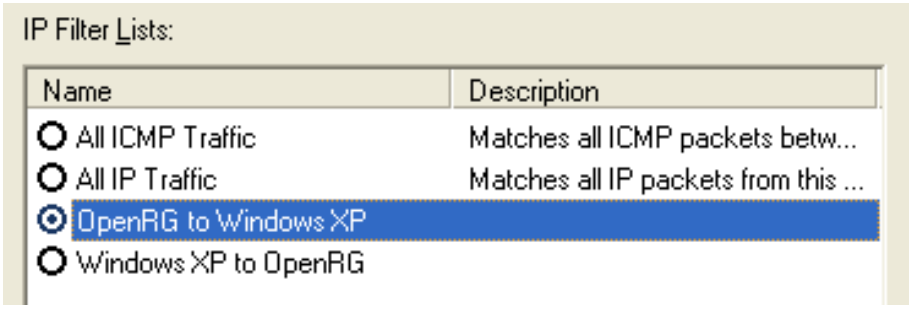


Figure 7.359. IP Filter List

2. Click the 'Filter Action' tab (see figure Figure 7.355).

3. Select the 'Require Security' radio button, and click the 'Edit' button. The 'Require Security Properties' window will appear (see figure Figure 7.356).

4. Verify that the 'Negotiate security' option is enabled, and deselect the 'Accept unsecured communication, but always respond using IPSec' check box. Select the 'Session key Perfect Forward Secrecy (PFS)' (the PFS option must be enabled on OpenRG), and click the OK button.

5. Under the 'Authentication Methods' tab, click the Edit button. The 'Edit Authentication Method Properties' window will appear (see figure Figure 7.357).

6. Select the 'Use this string (preshared key)' radio button, and enter a string that will be used as the key (for example, 1234). Click the 'OK' button.

7. Under the 'Tunnel Setting' tab, select the 'The tunnel endpoint is specified by this IP Address' radio button, and enter <windows_ip> (see figure Figure 7.360).

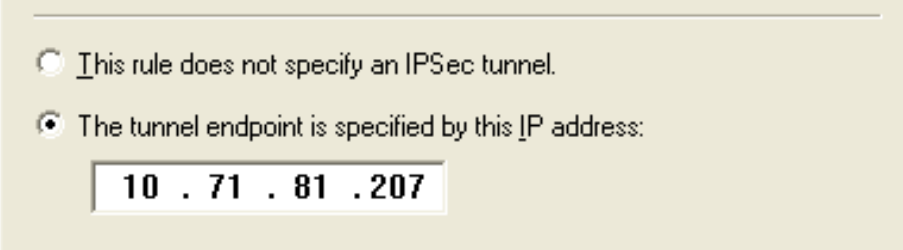


Figure 7.360. Tunnel Setting

8. Under the 'Connection Type' tab, verify that 'All network connections' is selected.

9. Click the 'Apply' button and then click the 'OK' button to save this rule.

10. Back on the 'OpenRG Connection Properties' window, note that the two new rules have been added to the 'IP Security rules' list (see figure Figure 7.361).

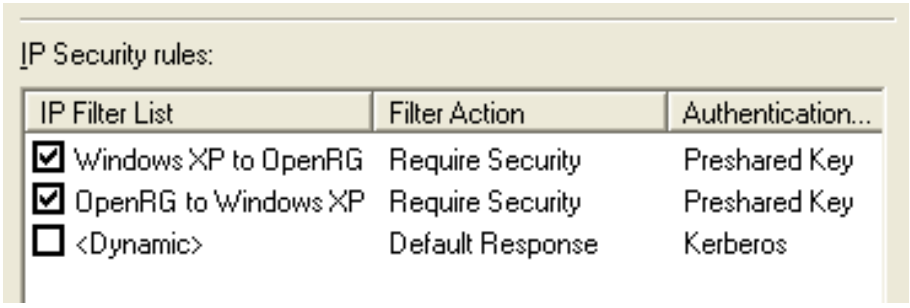


Figure 7.361. OpenRG Connection Properties

Click 'Close' to go back to the 'Local Security Settings' window (see figure Figure 7.344).

6. Assigning the New IPSec Policy: In the 'Local Security Settings' window, right-click the 'OpenRG Connection' policy, and select 'Assign'. A small green arrow will appear on the policy's folder icon and its status under the 'Policy Assigned' column will change to 'Yes' (see figure Figure 7.362).

Name	Description	Policy Assigned
Client (Respond Only)	Communicate normally (u...	No
OpenRG Connection		Yes
Secure Server (Requir...	For all IP traffic, always r...	No
Server (Request Secu...	For all IP traffic, always r...	No

Figure 7.362. Local Security Settings

7.10.1.5. IPSec Gateway-to-Gateway Connection Scenario

This section describes how to configure an IPSec gateway to gateway with a pre-shared secret scenario, developed by the VPN Consortium (VPNC) using OpenRG. OpenRG's VPN feature is VPNC certified.

7.10.1.5.1. Network Configuration

Establishing an IPSec tunnel between Gateways A and B creates a transparent and secure network for clients from subnets A and B, who can communicate with each other as if they were inside the same network.The following scenario depicts such a connection between two OpenRG gateways. The configurations of both gateways are identical, except for their IP addresses. This section describes the configuration of Gateway A only. The same configuration must be performed on Gateway B, with the exceptions that appear in the note admonitions.

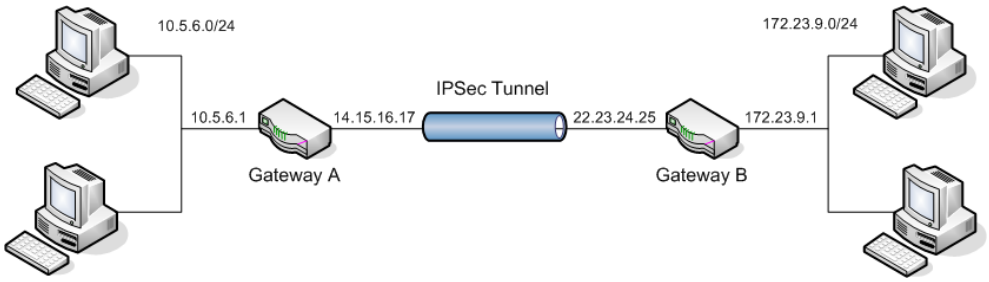


Figure 7.363. Configuration Diagram

- LAN Interface Settings

1. Click the 'Network Connections' tab in the 'System' screen. The 'Network Connections' screen appears.

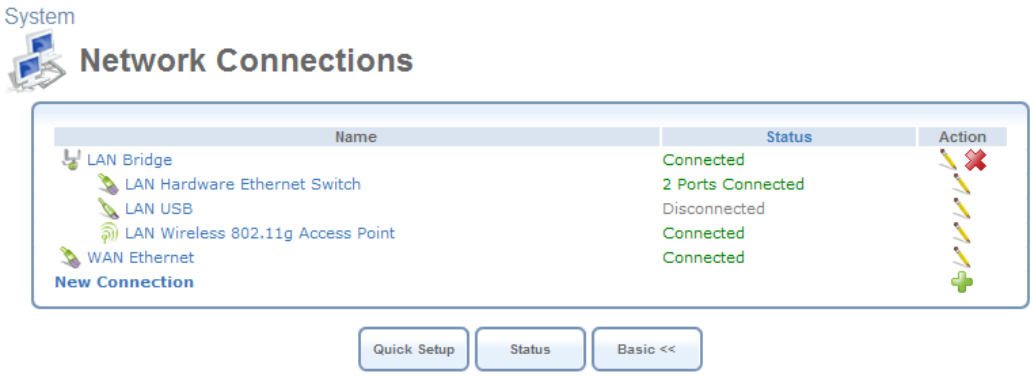


Figure 7.364. Network Connections

2. If your LAN Ethernet connection is bridged, click the 'LAN Bridge' link (as depicted in this example). Otherwise, click the 'LAN Ethernet' link (or the 'LAN Hardware Ethernet Switch' link, depending on your platform). The 'LAN Bridge Properties' screen appears.

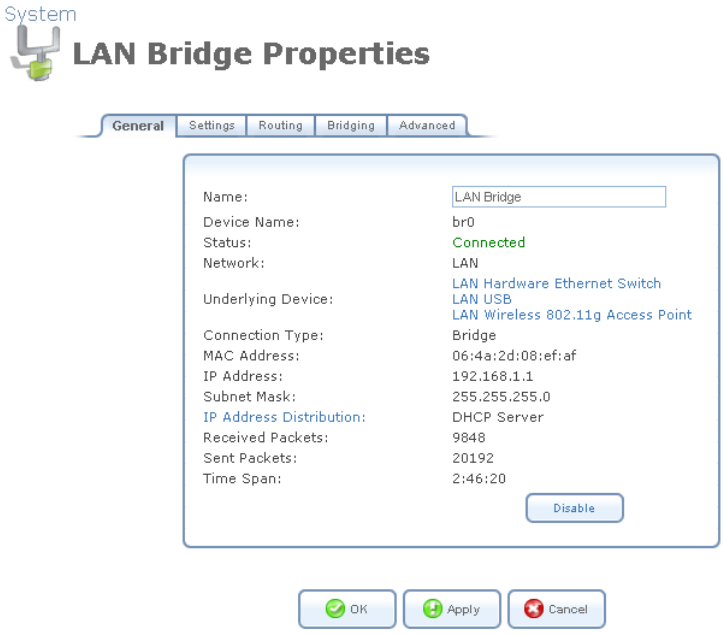


Figure 7.365. LAN Bridge Properties – General

3. Press the 'Settings' tab, and configure the following settings:

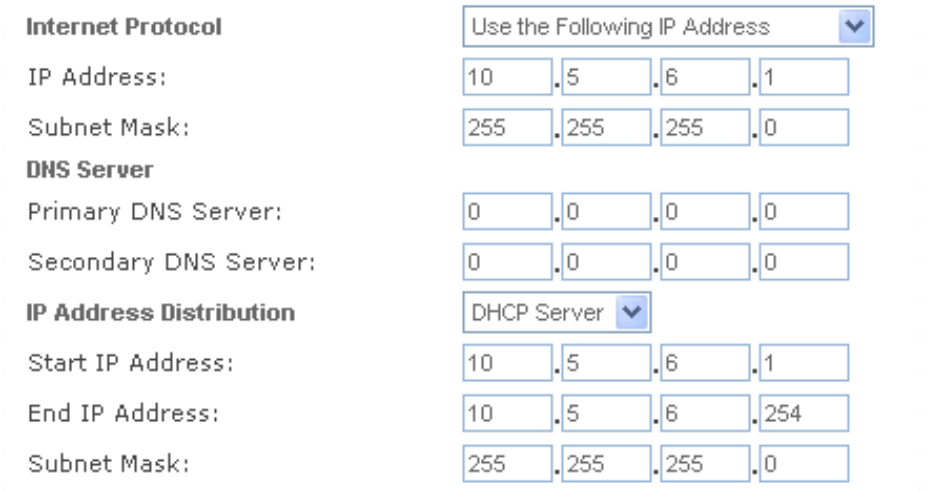

Internet Protocol
Use the Following IP Address
IP Address:
10 . 5 . 6 . 1
Subnet Mask:
255 . 255 . 255 . 0
DNS Server
Primary DNS Server:
0 . 0 . 0 . 0
Secondary DNS Server:
0 . 0 . 0 . 0
IP Address Distribution
DHCP Server
Start IP Address:
10 . 5 . 6 . 1
End IP Address:
10 . 5 . 6 . 254
Subnet Mask:
255 . 255 . 255 . 0

Figure 7.366. LAN Bridge Properties – Settings

Internet Protocol Select "Use the Following IP Address"

IP Address Specify 10.5.6.1

Subnet Mask Specify 255.255.255.0

IP Address Distribution Select "DHCP Server"

Start IP Address Specify 10.5.6.1

End IP Address Specify 10.5.6.254

Subnet Mask Specify 255.255.255.0

Note: When configuring Gateway B, the IP address should be 172.23.9.1, according to the example depicted here.

4. Click 'OK' to save the settings.

- WAN Interface Settings

1. Click the 'Network Connections' tab in the 'System' screen. The 'Network Connections' screen appears.

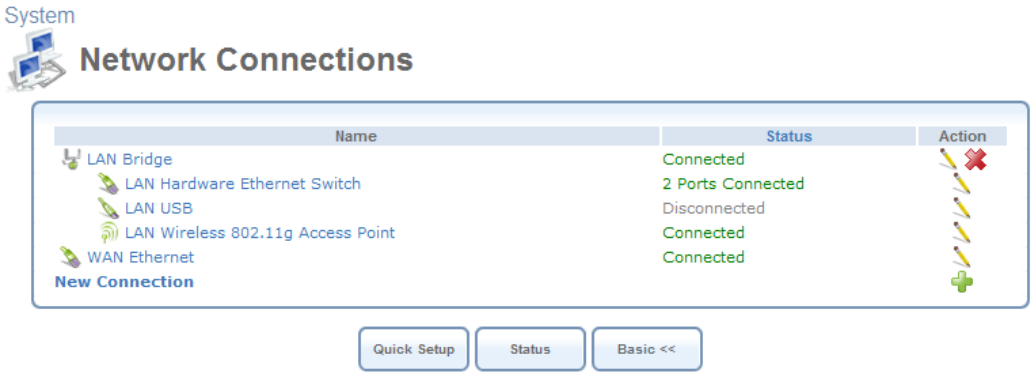


Figure 7.367. Network Connections

2. Click the 'WAN Ethernet' link, the 'WAN Ethernet Properties' screen appears.

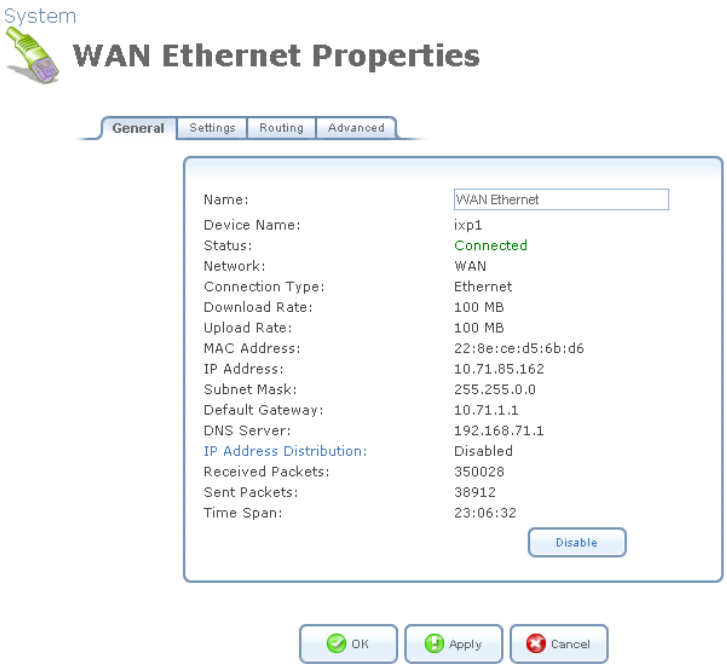


Figure 7.368. WAN Ethernet Properties – General

3. Press the 'Settings' tab, and configure the following settings:

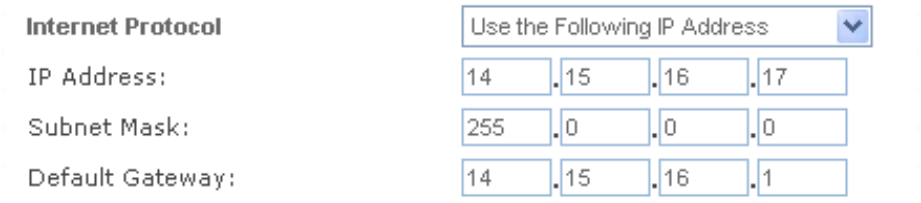


Figure 7.369. WAN Ethernet Properties – Settings

Internet Protocol Select "Use the Following IP Address"

IP Address Specify 14.15.16.17

Subnet Mask Specify the appropriate subnet mask, i.e 255.0.0.0

Default Gateway Specify the appropriate Default Gateway in order to enable IP routing, i.e 14.15.16.1

Note: When configuring Gateway B, the IP address should be 22.23.24.25, and the default gateway 22.23.24.1, according to the example depicted here.

4. Click 'OK' to save the settings.

7.10.1.5.2. Gateway-to-Gateway with Pre-shared Secrets

A typical gateway-to-gateway VPN uses a pre-shared secret for authentication. Gateway A connects its internal LAN 10.5.6.0/24 to the Internet. Gateway A's LAN interface has the address 10.5.6.1, and its WAN (Internet) interface has the address 14.15.16.17. Gateway B connects the internal LAN 172.23.9.0/24 to the Internet. Gateway B's WAN (Internet) interface has the address 22.23.24.25. The Internet Key Exchange (IKE) Phase 1 parameters used are:

- Main mode
- 3DES (Triple DES)
- SHA-1
- MODP group 2 (1024 bits)
- Pre-shared secret of "hr5x"
- SA lifetime of 28800 seconds (eight hours) with no Kbytes re-keying

The IKE Phase 2 parameters used are:

- 3DES (Triple DES)
- SHA-1
- ESP tunnel mode
- MODP group 2 (1024 bits)
- Perfect forward secrecy for re-keying
- SA lifetime of 3600 seconds (one hour) with no Kbytes re-keying
- Selectors for all IP protocols, all ports, between 10.5.6.0/24 and 172.23.9.0/24, using IPv4 subnets

To set up Gateway A for this scenario, follow these steps:

1. Click the 'Network Connections' tab in the 'System' screen. The 'Network Connections' screen appears.

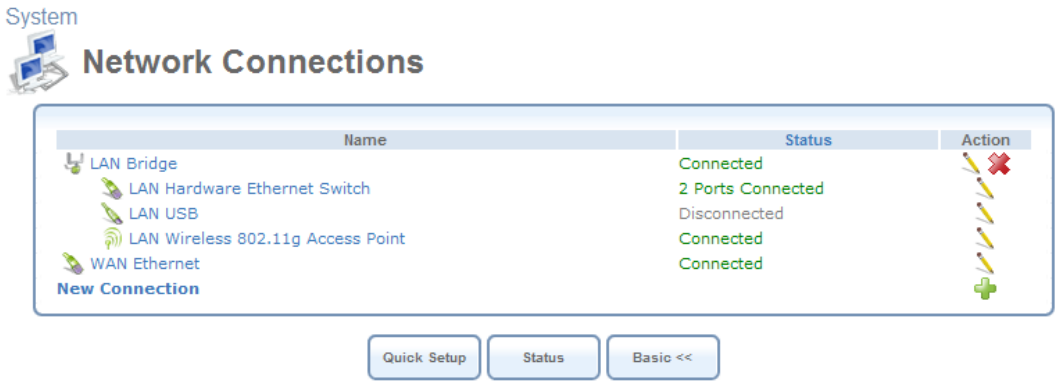


Figure 7.370. Network Connections

2. Click the 'New Connection' link. The 'Connection Wizard' screen appears.

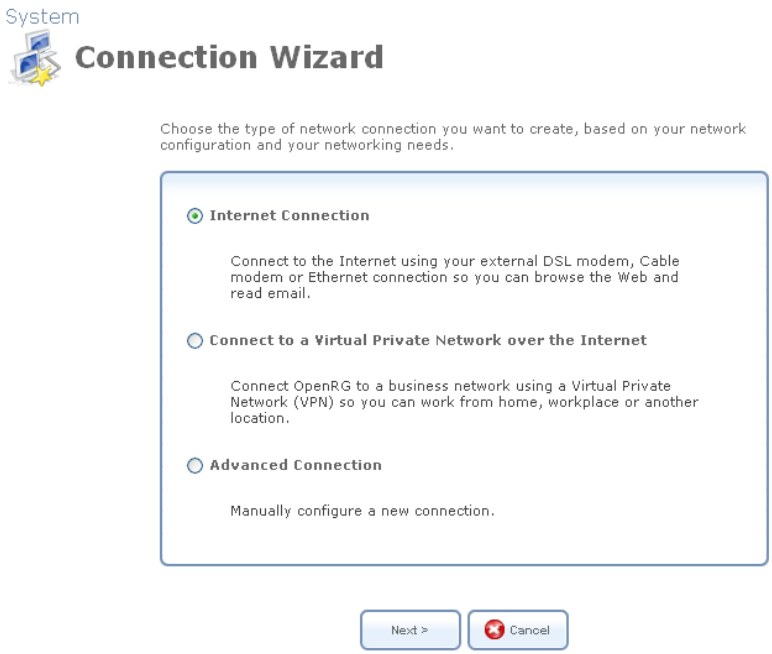

System
Connection Wizard
Choose the type of network connection you want to create, based on your network configuration and your networking needs.
Internet Connection
Connect to the Internet using your external DSL modem, Cable modem or Ethernet connection so you can browse the Web and read email.
Connect to a Virtual Private Network over the Internet
Connect OpenRG to a business network using a Virtual Private Network (VPN) so you can work from home, workplace or another location.
Advanced Connection
Manually configure a new connection.
Next >
Cancel

Figure 7.371. Connection Wizard

3. Select the 'Connect to a Virtual Private Network over the Internet' radio button and click 'Next'. The 'Connect to a Virtual Private Network over the Internet' screen appears.

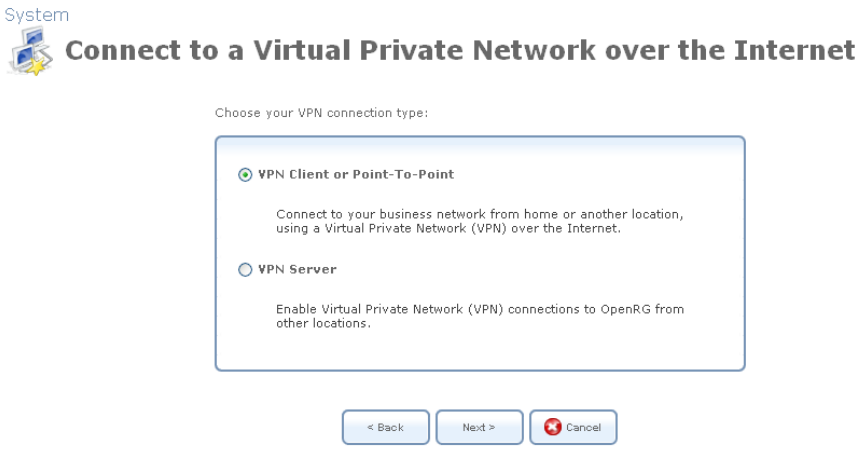

System
Connect to a Virtual Private Network over the Internet
Choose your VPN connection type:
VPN Client or Point-To-Point
Connect to your business network from home or another location, using a Virtual Private Network (VPN) over the Internet.
VPN Server
Enable Virtual Private Network (VPN) connections to OpenRG from other locations.
< Back
Next >
Cancel

Figure 7.372. Connect to a Virtual Private Network over the Internet

4. Select the 'VPN Client or Point-To-Point' radio button and click 'Next'. The 'VPN Client or Point-To-Point' screen appears.

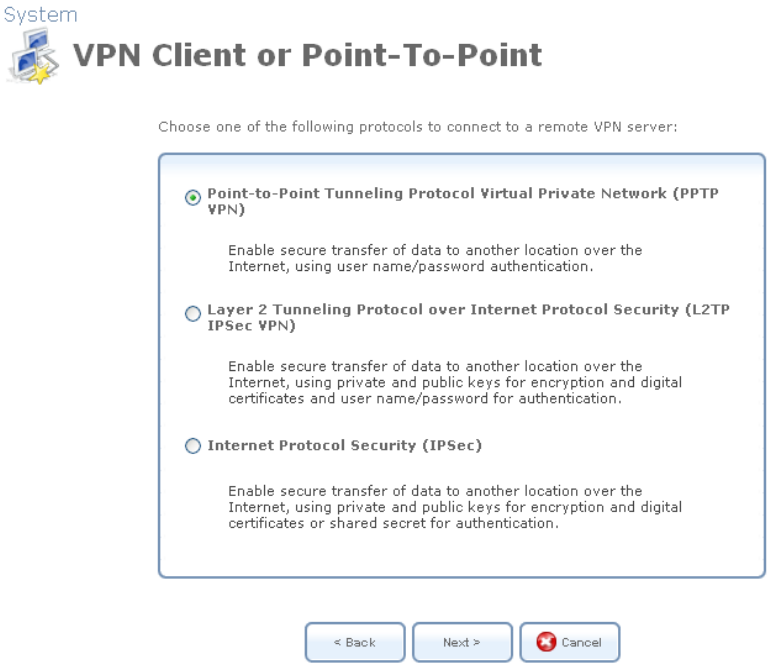

System
VPN Client or Point-To-Point
Choose one of the following protocols to connect to a remote VPN server:
Point-to-Point Tunneling Protocol Virtual Private Network (PPTP VPN)
Enable secure transfer of data to another location over the Internet, using user name/password authentication.
Layer 2 Tunneling Protocol over Internet Protocol Security (L2TP IPSec VPN)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates and user name/password for authentication.
Internet Protocol Security (IPSec)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates or shared secret for authentication.
< Back
Next >
Cancel

Figure 7.373. VPN Client or Point-To-Point

5. Select the 'Internet Protocol Security (IPSec)' radio button and click 'Next'. The 'Internet Protocol Security (IPSec)' screen appears.

Figure 7.374. Internet Protocol Security (IPSec)

6. Specify the following parameters, as depicted in Figure 7.375).

   Host Name or IP Address of Destination Gateway Specify 22.23.24.25

   Remote IP Select "IP Subnet"

   Remote Subnet IP Address Specify 172.23.9.0

   Remote Subnet Mask Specify 255.255.255.0

   Shared Secret Specify "hr5x"

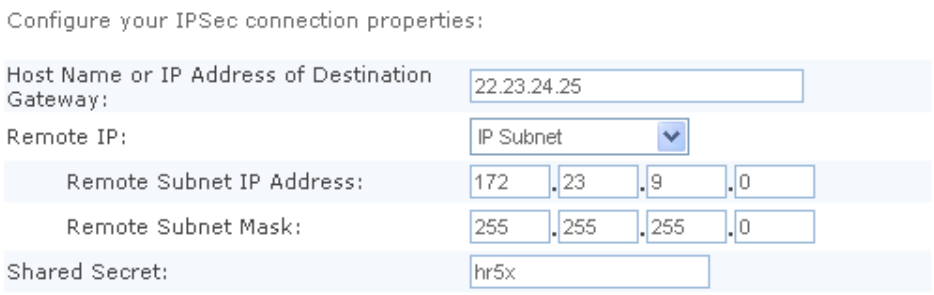


Figure 7.375. Internet Protocol Security (IPSec)

7. Click 'Next', the 'Connection Summary' screen appears.

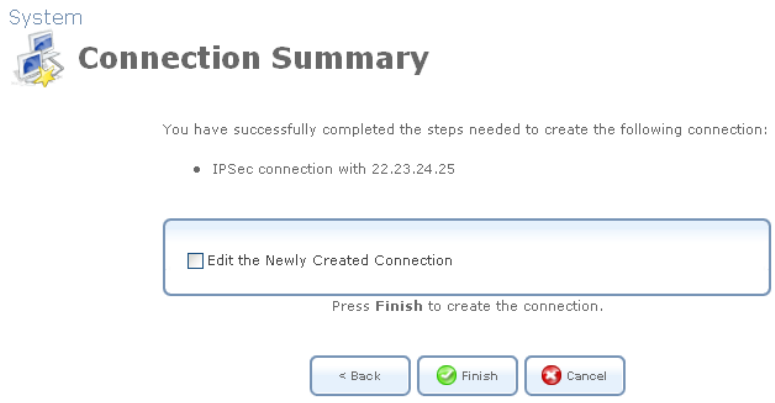


Figure 7.376. Connection Summary

8. Select the 'Edit the Newly Created Connection' check box, and click 'Finish'. The 'VPN IPSec Properties' screen appears, displaying the 'General' tab.

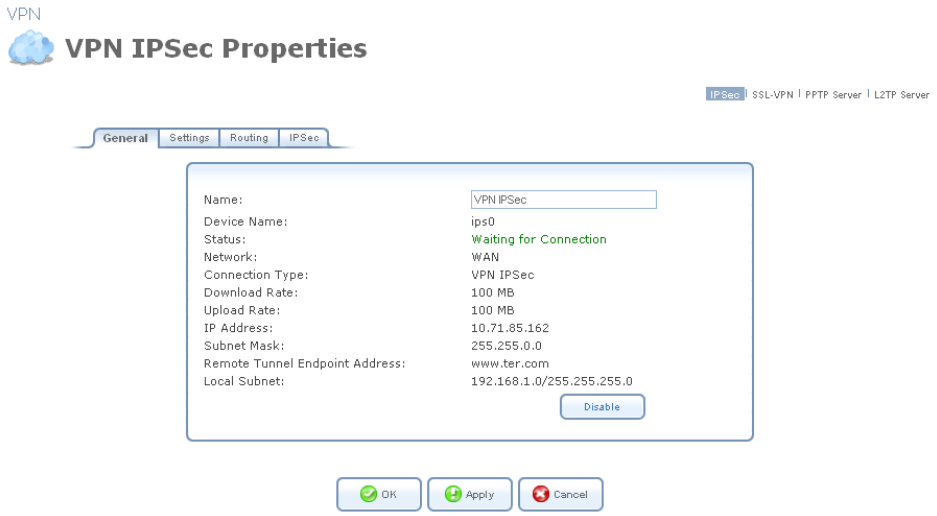


Figure 7.377. VPN IPSec Properties – General

9. Press the 'IPSec' tab, and configure the following settings:

   - Deselect the 'Compress' check box.
   - Under 'Hash Algorithm', deselect the 'Allow Peers to Use MD5' check box.
   - Under 'Group Description Attribute', deselect the 'DH Group 5 (1536 bit)' check box.
   - Under 'Encryption Algorithm', deselect the 'Allow AH Protocol (No Encryption)' check box.

10. Click 'OK' to save the settings. The 'Network Connections' screen appears. Note that the IPSec connection's status has changed to "Connected".

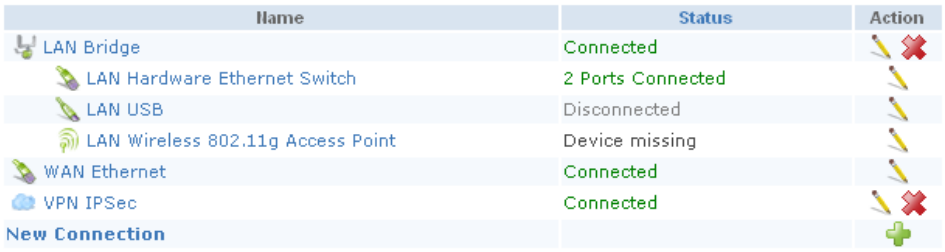


Figure 7.378. Connected VPN IPSec Connection

7.10.1.5.3. Gateway-to-Gateway with Peer Authentication of Certificates

An additional authentication method for a gateway-to-gateway VPN is peer authentication of certificates. Authentication is performed when each gateway presents a certificate, signed by a mutually agreed upon Certificate Authority (CA), to the other gateway.

For testing purposes, Linux provides a mechanism for creating self-signed certificates, thus eliminating the need to acquire them from the CA. This section provides a description for this procedure, after which you will be able to use these certificates for authentication of the gateway-to-gateway VPN connection.

To create a self-signed certificate, perform the following:

1. Install the OpenSSL Debian package:

```
$ rt apt-get install openssl
```

2. Create a directory for the certificates:

```
$ cd ~
$ mkdir cert_create
$ cd cert_create/
```

3. Use the Linux 'CA.sh' utility. Note that only the required fields are listed below. For the rest, you may simply press Enter.

```
$ /usr/lib/ssl/misc/CA.sh -newca
    Enter PEM pass phrase: <enter a password>
    Common Name: <enter your CA name>
    Enter pass phrase for ./demoCA/private/./cakey.pem: <enter a password>
```

   For more information about this script, run 'man CA.pl' (CA.pl and CA.sh are the same).

4. Copy the certificates from the **/demoCA** directory under which they were created, providing them with your CA name.

```
$ cp demoCA/cacert.pem <your CA name>_cacert.pem
$ cp demoCA/careq.pem <your CA name>_careq.pem
```

5. Load the new certificates to both gateways:

   a. Browse to the 'Advanced' tab and click the 'Certificates' icon.

   b. Select the 'CA's' sub-tab and click 'Upload Certificate'. The 'Load CA's Certificate' screen appears.

   c. Browse for the location of the certificate, which is **~/cert_create/<your CA name>_cacert.pem**, and click 'Upload'.

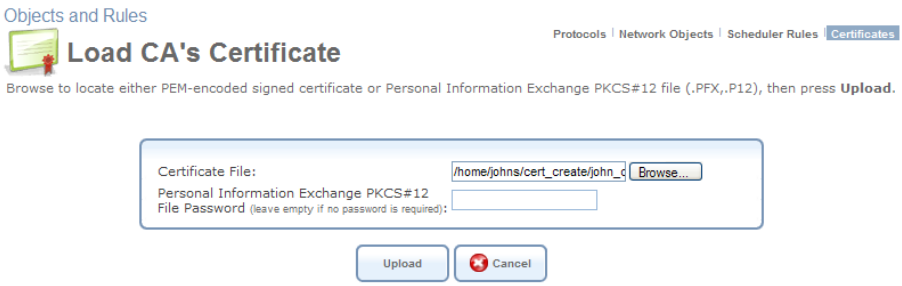

Objects and Rules
Load CA's Certificate
Protocols | Network Objects | Scheduler Rules | Certificates
Browse to locate either PEM-encoded signed certificate or Personal Information Exchange PKCS#12 file (.PFX,.P12), then press Upload.
Certificate File:
/home/johns/cert_create/john_c
Browse...
Personal Information Exchange PKCS#12
File Password (leave empty if no password is required):
Upload
Cancel

Figure 7.379. Load CA's Certificate

6. Generate a certificate request from both gateways:

   a. Browse to the 'Advanced' tab and click the 'Certificates' icon.

   b. In the 'OpenRG's Local' sub-tab, click 'Create Certificate Request'. The 'Create X509 Request' screen appears.

   c. In the 'Certificate Name' field, enter "OpenRG-1" (and "OpenRG-2" on the other gateway, respectively).

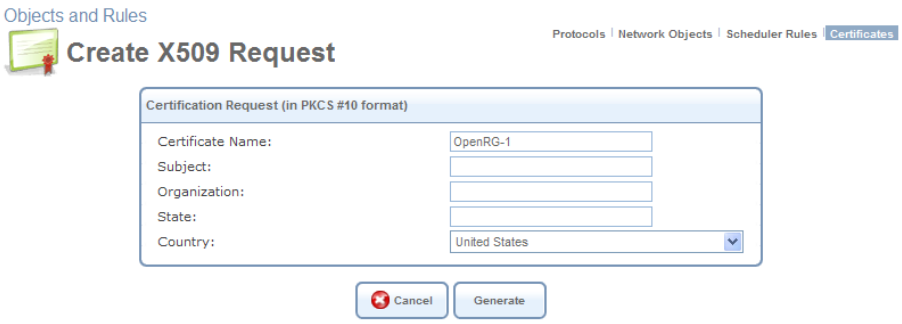


Figure 7.380. Create X509 Request

d. Click 'Generate' and then 'Refresh'. The 'New X509 Request' screen appears.

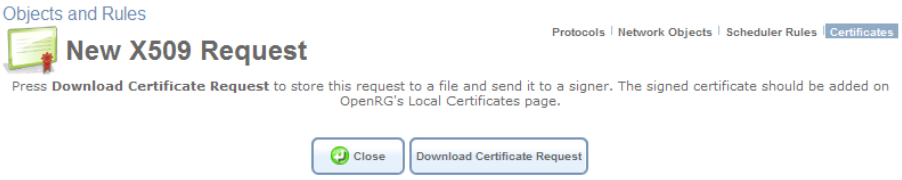

Objects and Rules
New X509 Request
Protocols | Network Objects | Scheduler Rules | Certificates
Press Download Certificate Request to store this request to a file and send it to a signer. The signed certificate should be added on OpenRG's Local Certificates page.
Close
Download Certificate Request

Figure 7.381. New X509 Request

e. Click 'Download Certificate Request', and save the file under **~/cert_create/OpenRG-1/2_OpenRG.csr**.

Note: Do not delete the empty certificate that now appears under the 'OpenRG's Local' sub-tab, as this is the request itself. If you delete it, the certificate will not be accepted by OpenRG.

7. Sign the certificate request using the 'CA.sh' script on both gateways:

```
$ mv <OpenRG-1/2>OpenRG.csr newreq.pem
$ /usr/lib/ssl/misc/CA.sh -sign
    Enter pass phrase for ./demoCA/private/cakey.pem: <enter a password>
$ mv newcert.pem <OpenRG-1/2>_newcert.pem
$ mv newreq.pem <OpenRG-1/2>_newreq.pem
```

8. Load the certificates to both gateways:

   a. Browse to the 'Advanced' tab and click the 'Certificates' icon.

   b. In the 'OpenRG's Local' sub-tab, click 'Upload Certificate'. The 'Load OpenRG's Local Certificate' screen appears.

   c. Browse for the location of the certificate, which is **~/cert_create/<OpenRG-1/2>_newcert.pem**, and click 'Upload'.

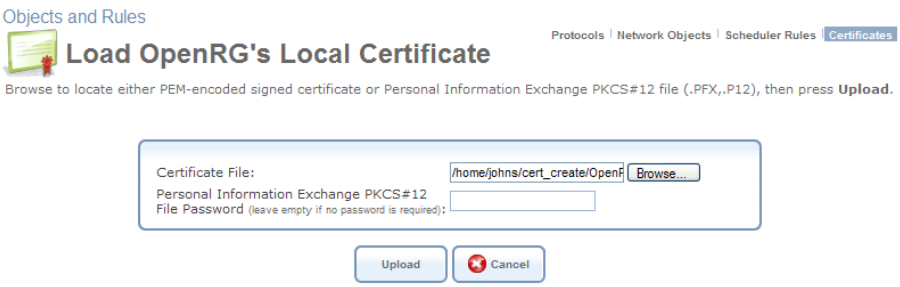

Objects and Rules
Load OpenRG's Local Certificate
Protocols | Network Objects | Scheduler Rules | Certificates
Browse to locate either PEM-encoded signed certificate or Personal Information Exchange PKCS#12 file (.PFX,.P12), then press Upload.
Certificate File:
/home/johns/cert_create/OpenR
Browse...
Personal Information Exchange PKCS#12 File Password (leave empty if no password is required):
Upload
Cancel

Figure 7.382. Load OpenRG's Local Certificate

To authenticate the VPN connection with the created certificates, perform the following:

1. Click the 'VPN IPSec' link in the 'Network Connections' screen, and then click the 'IPSec' sub-tab.
2. In the 'IPSec Automatic Phase 1' section, in the 'Peer Authentication' drop-down menu, select "Certificate". The screen refreshes, providing additional settings.

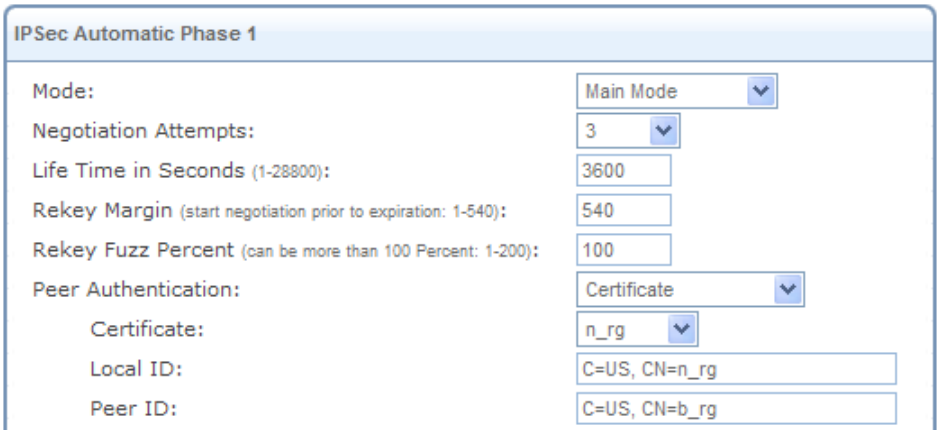


Figure 7.383. VPN IPSec Properties

3. In the 'Certificate' drop-down menu, select Gateway A's newly added certificate.
4. In the 'Local ID' field, enter Gateway A's certificate details, for example "C=US, CN=n_rg".
5. In the 'Peer ID' field, enter Gateway B's certificate details, for example "C=US, CN=b_rg".
6. Click 'OK' to save the settings.

Perform the same procedure on Gateway B with its respective parameters. When done, the IPSec connection's status should change to "Connected".

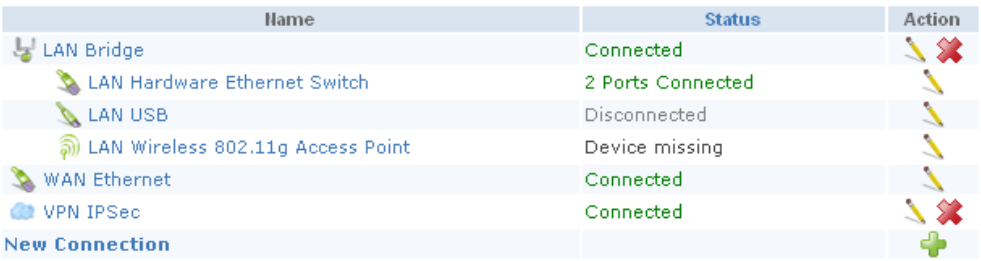


Figure 7.384. Connected VPN IPSec Connection

7.10.2. Secure Socket Layer VPN

Secure Socket Layer Virtual Private Network (SSL VPN) provides simple and secure remote access to home and office network resources. It provides the security level of IPSec, but with the simplicity of using a standard Web browser. The unparalleled advantage of SSL VPN is its zero-configuration on the client's end. Remote users can simply browse to OpenRG from any computer in the world and run applications on its LAN computers. However, since SSL VPN is not a tunnel such as PPTP or IPSec, only pre-defined applications may be used. When using this feature, non-administrator remote users browsing to OpenRG will be routed to the "SSL VPN Portal". This portal will present them each with his/her list of applications.

Note: The only requirement for the client computer is the availability of Java Runtime Environment (JRE), which is mandatory for using this feature. To obtain the latest JRE version, browse to http://www.sun.com .

7.10.2.1. Configuring SSL VPN

Access the Secure Socket Layer VPN (SSL VPN) settings either from its link in the 'VPN' tab under the 'Services' screen, or by clicking the 'SSL VPN' icon in the 'Advanced' screen. The 'SSL VPN' screen appears.

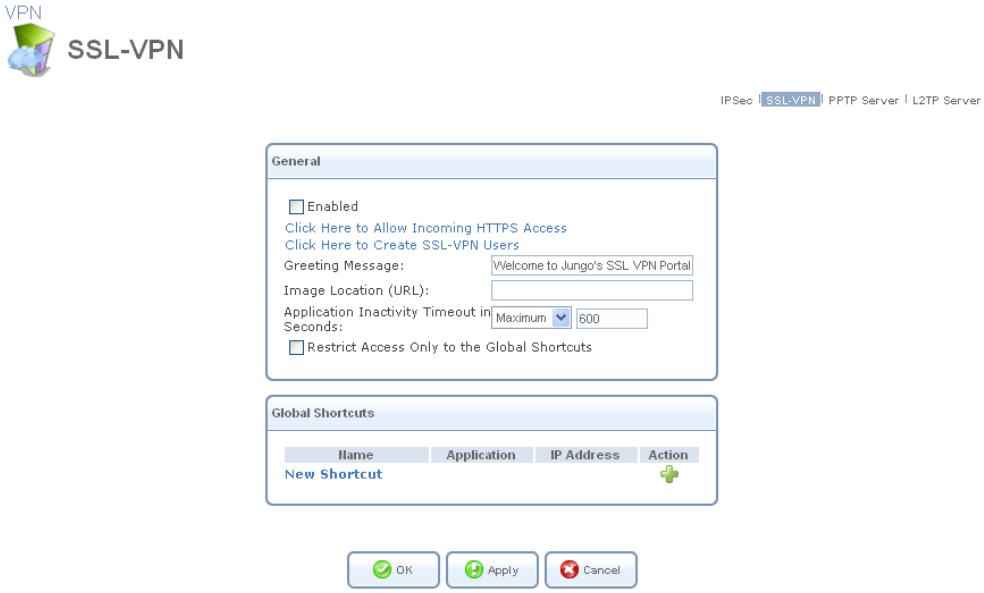


Figure 7.385. SSL VPN

This screen enables you to configure the following:

Enabled Check or un-check this box to enable or disable this feature.
After checking the box, click 'Apply'. The screen displays a link to the SSL-VPN Portal.

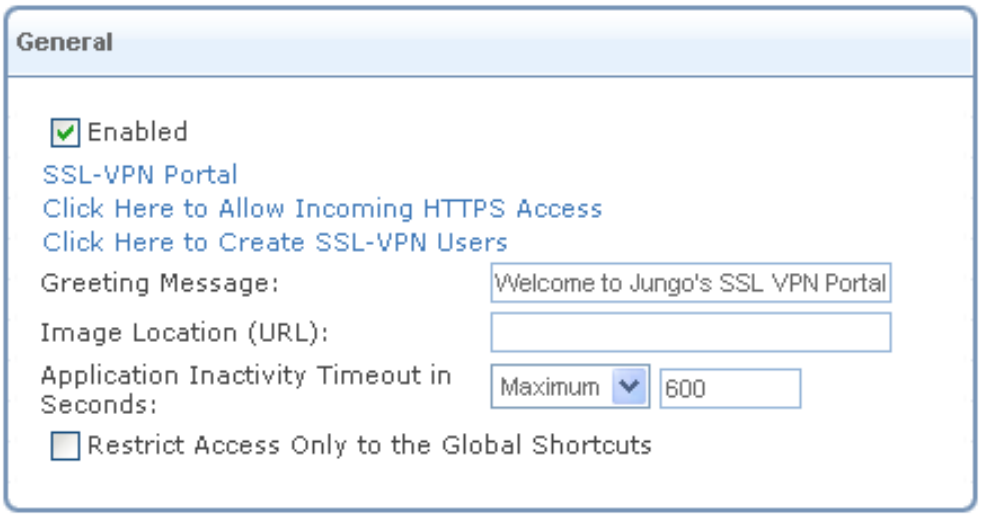


Figure 7.386. Enabled SSL VPN

SSL-VPN Portal Click this link to open the SSL-VPN portal that remote users will access when browsing to OpenRG. The portal screen appears (see figure Figure 7.387). When a user logs in with a username and password, the screen displays a list of the computers (hosts) connected to the gateway. The remote user can click a computer's link to view and access its available services. You can install the Java Runtime Environment (JRE), required for this feature, by clicking the provided link.

Figure 7.387. SSL VPN Portal

Click Here to Allow Incoming HTTPS Access Use this link to access OpenRG's remote administration screen, from where you can selectively enable services that grant remote access to OpenRG (refer to section Section 8.7.3 [584]). In order to use SSL VPN, open either HTTPS port 443 or 8443 (or both):

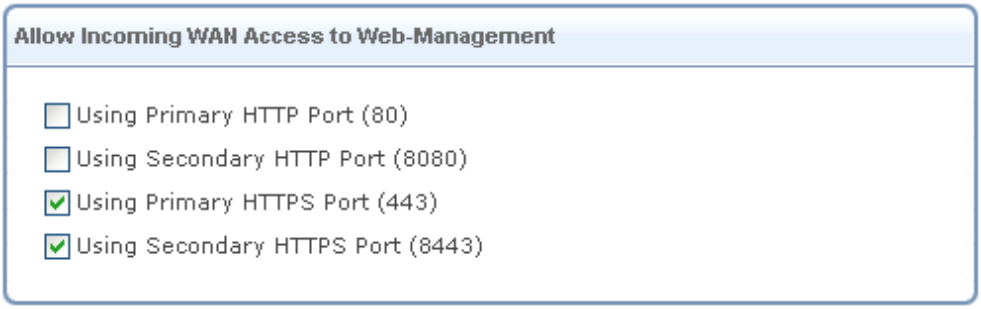

Allow Incoming WAN Access to Web-Management
Using Primary HTTP Port (80)
Using Secondary HTTP Port (8080)
Using Primary HTTPS Port (443)
Using Secondary HTTPS Port (8443)

Figure 7.388. Remote Administration Ports

Click Here to Create SSL-VPN Users Click this link to define the remote users that will be granted access to your home network. The 'Users' screen appears (see figure Figure 8.6). Refer to section Section 8.3 to learn how to define and configure users. In order for a user to be able to use SSL VPN, enable the 'Remote Access by SSL VPN' option for that user. You can specify a group of users in the same manner.

Greeting Message Enter the greeting message that will appear at the top of the SSL VPN portal screen.

Image Location (URL) Enter the URL of an image you would like to display at the top-left of the portal screen (instead of the default image).

Application Inactivity Timeout in Seconds The timeframe of application idleness in seconds, after which the application disconnects. The user will have to use the shortcut to reactivate the application. Enter zero if you would like to make this timeframe unlimited.

Restrict Access Only to the Global Shortcuts When checked, only the Global shortcuts will appear and be accessible.

7.10.2.2. Shortcuts to Applications

The second section of the 'SSL VPN' screen (see figure Figure 7.385) displays the shortcuts to the applications available to remote users. These shortcuts can be either global or private shortcuts (links).

- **Global Shortcuts** -- Shortcuts configured in the WBM, which are displayed for specific users or groups when logged in. To add a new global shortcut, perform the following:

  1. Click the 'New Shortcut' link. The 'Shortcut Wizard' screen appears:

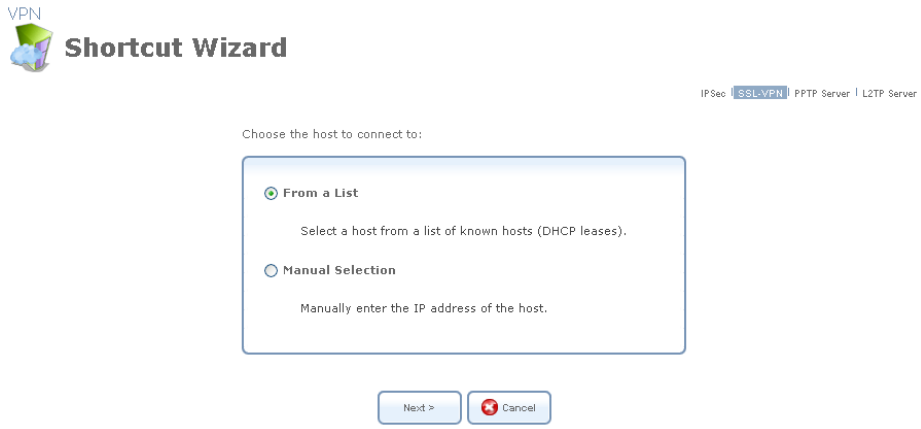


Figure 7.389. Shortcut Wizard

  2. Choose whether to select a host from a given list, comprised of DHCP leases that are known to OpenRG, or to manually enter the host's IP address, and press the 'Next' button. If you choose 'From a List', the following screen appears (see figure Figure 7.390). Select the host to which you would like to add a shortcut, and press 'Next'.

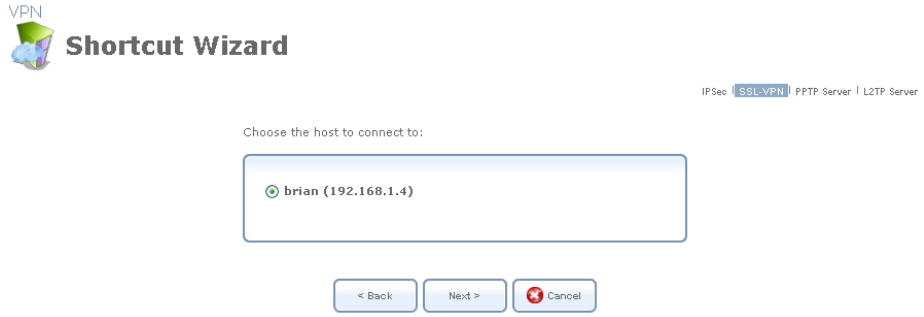


Figure 7.390. Choose Host from List

The next wizard screen appears (see figure Figure 7.391), either with the IP address of a selected host, or without an IP address for manual selection.

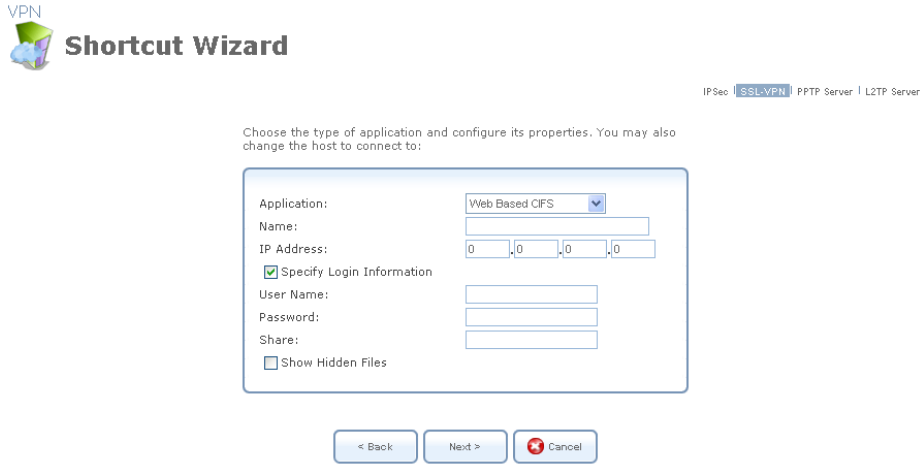


Figure 7.391. Select and Configure an Application

3. Select the application to launch when the user clicks this shortcut. Each application refreshes the screen to display its configurable parameters. The available applications are explained in the next section (Section 7.10.2.3). After configuring an application's parameters, press 'Next'. The 'Shortcut Summary' screen appears:

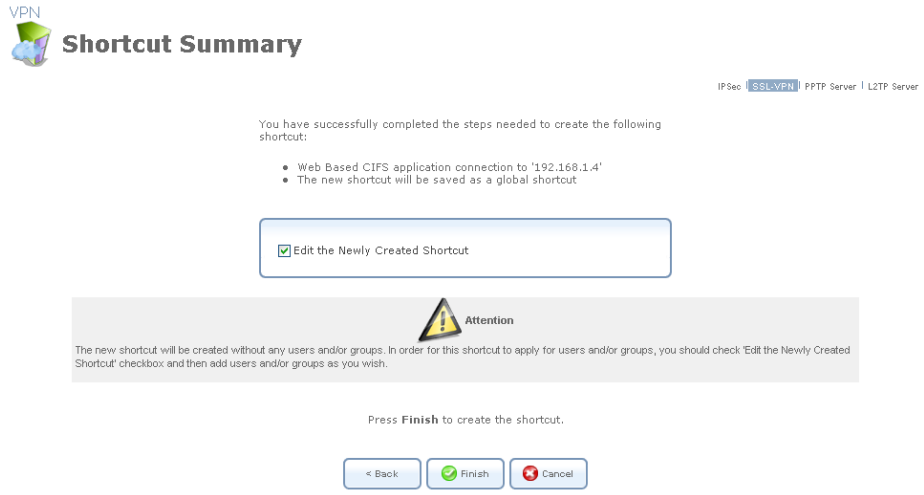

VPN
Shortcut Summary
IPSec | SSL-VPN | PPTP Server | L2TP Server
You have successfully completed the steps needed to create the following shortcut:
Web Based CIFS application connection to '192.168.1.4'
The new shortcut will be saved as a global shortcut
Edit the Newly Created Shortcut
Attention
The new shortcut will be created without any users and/or groups. In order for this shortcut to apply for users and/or groups, you should check 'Edit the Newly Created Shortcut' checkbox and then add users and/or groups as you wish.
Press Finish to create the shortcut.
< Back
Finish
Cancel

Figure 7.392. Shortcut Summary

1. Check the 'Edit the Newly Created Shortcut' check box in order to associate a user or a group with this shortcut, and click 'Finish'. The 'Edit Shortcut' screen appears:

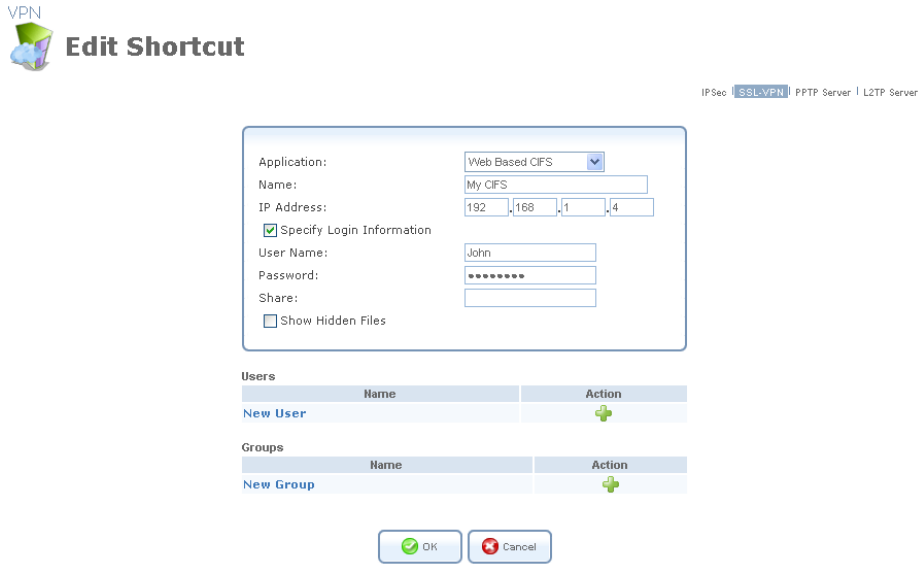


Figure 7.393. Edit Shortcut

2. Click the 'New User' link (or 'New Group' according to your preference), and select a user with remote SSL VPN access permission from the combo box:

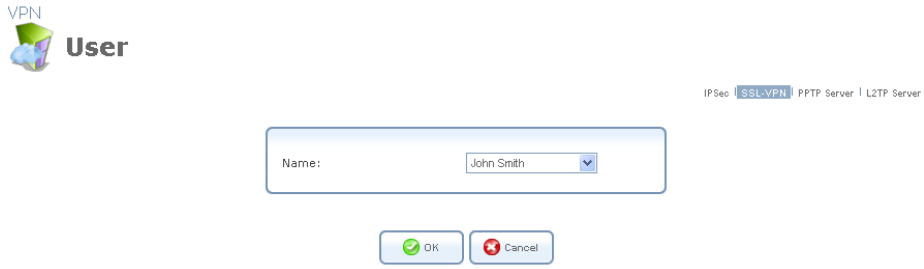


Figure 7.394. User

3. Click 'OK'. The new user is added to the 'Users' section in the 'Edit Shortcut' screen:

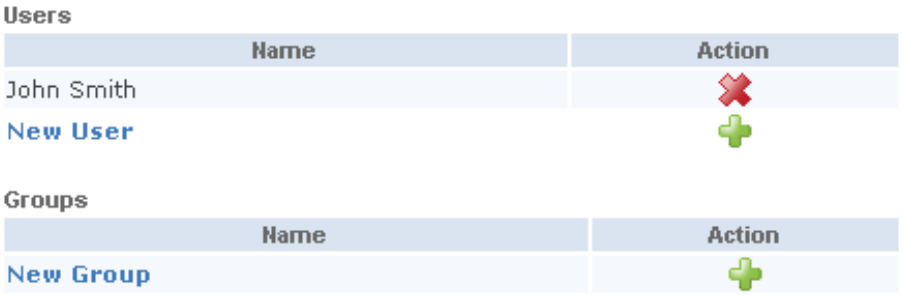


Figure 7.395. Associated User

4. Click 'OK' to save the settings.

In addition, the 'Global Shortcuts' section enables you to view file sharing invitations that you send to remote users (refer to section Section 7.11.2.3). Whenever an invitation is sent, its log appears in the 'Global Shortcuts' section.

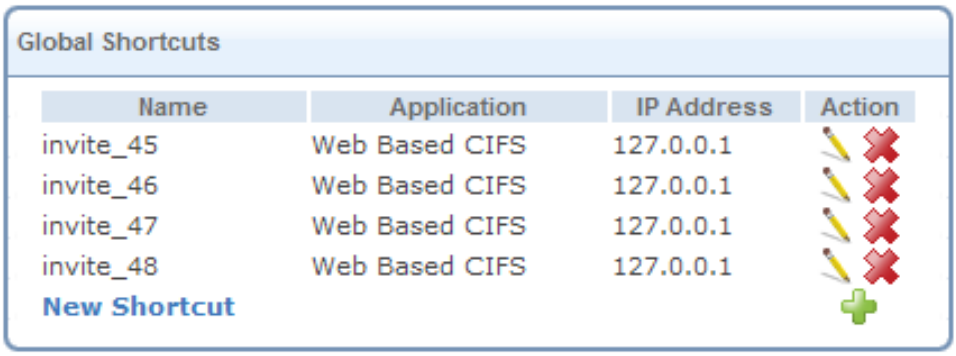


Figure 7.396. Remote File Access Invitations Log

For a detailed view of an invitation, click its action icon . To remove an invitation from a list, click its action icon . This will also cancel the invitation. If you removed an invitation by mistake, you can recover it by clicking the 'Reconfigure My Settings' button in the Jungo.net portal's 'Account' screen. The Jungo.net portal will reconfigure your gateway, and the removed invitation will reappear in the list. For more information, refer to the Jungo.net User Manual.

- **Private Shortcuts** -- Each user can use the SSL-VPN Portal to configure private shortcuts, displayed only for him when logged in. To add a new private shortcut, perform the following:

  1. Click the 'SSL-VPN Portal' link in the 'SSL-VPN' screen (see figure Figure 7.386). The 'SSL-VPN Portal' screen appears (see figure Figure 7.387).

  2. Click the Shortcuts button. The 'Shortcuts' screen appears.

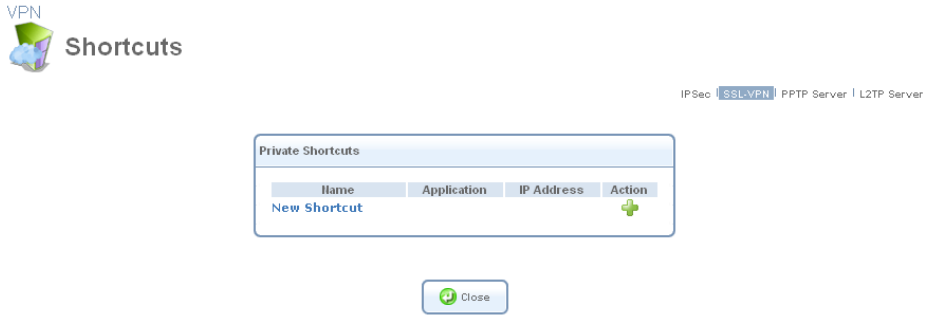


Figure 7.397. Shortcuts

  3. Click the 'New Shortcut' link. The 'Shortcut Wizard' screen appears (see figure Figure 7.389). This process is identical to the addition of a global shortcut described above.

  4. After configuring the application parameters, press the 'Next' button. The following wizard screen appears:

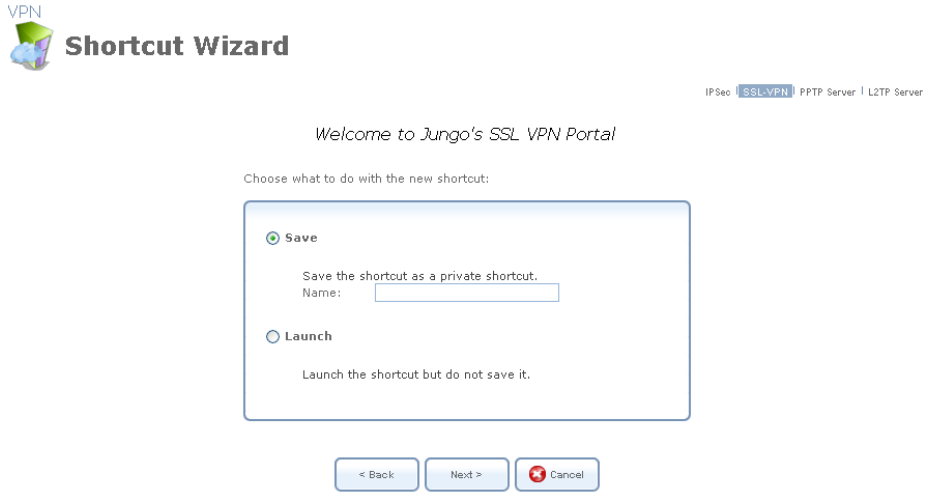

VPN
Shortcut Wizard
IPSec | SSL-VPN | PPTP Server | L2TP Server
Welcome to Jungo's SSL VPN Portal
Choose what to do with the new shortcut:
Save
Save the shortcut as a private shortcut.
Name:
Launch
Launch the shortcut but do not save it.
< Back
Next >
Cancel

Figure 7.398. Save or Launch

5. You can either save the private shortcut or launch it without saving.

   - To save the shortcut, select the 'Save' radio button, enter a name, and click 'Next'. The next screen displays the shortcut summary. Click 'Finish' to create the new private shortcut.

   - To launch the shortcut, select the 'Launch' radio button and click 'Next'. The next screen displays the shortcut summary (see figure Figure 7.399). Click the provided link to launch the application, or 'Finish' to exit the wizard without saving.

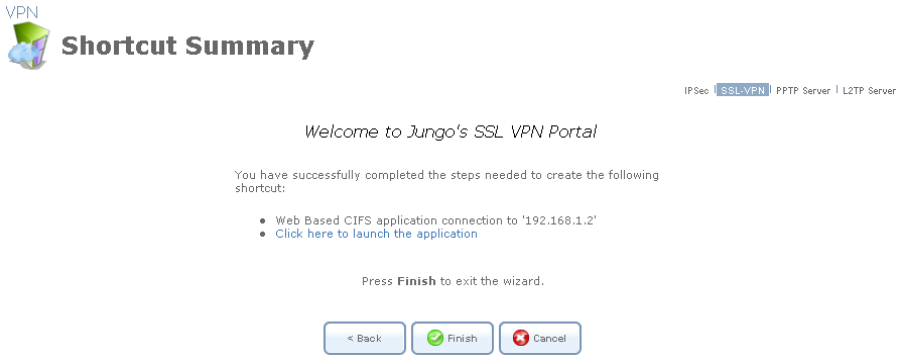

VPN
Shortcut Summary
IPSec | SSL-VPN | PPTP Server | L2TP Server
Welcome to Jungo's SSL VPN Portal
You have successfully completed the steps needed to create the following shortcut:
Web Based CIFS application connection to '192.168.1.2'
Click here to launch the application
Press Finish to exit the wizard.
< Back
Finish
Cancel

Figure 7.399. Launch

7.10.2.3. SSL VPN Applications

7.10.2.3.1. Web-based CIFS

This option enables the user to open a Web-based Common Internet File System (CIFS) application using the OpenRG WBM. Configure the following parameters:

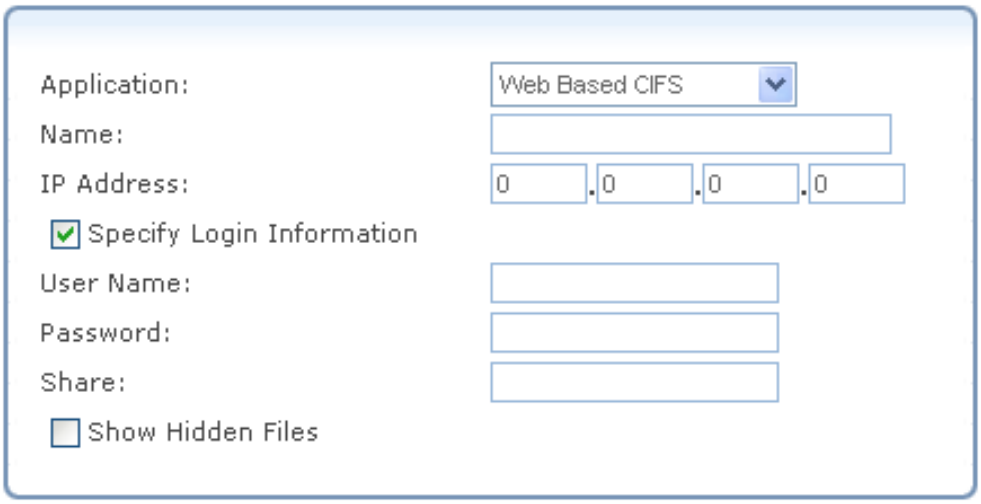


Figure 7.400. Web Based CIFS Parameters

Name Enter a name for this shortcut.

IP Address Enter the IP address of the LAN computer on which to perform the application.

Specify Login Information If the LAN computer requires a login, specify the following parameters to auto-login when launching the application:

User Name The user name with which to login.

Password The password with which to login.

Share Specify the name of the share directory on which to perform the application.

Show Hidden Files Select this check-box to allow showing of hidden files.
Once you configure a shortcut to Web-based CIFS and associate it with a user (or group), you can use the application when logged in as that user, by clicking the shortcut link that appears in the 'SSL VPN Portal' screen:

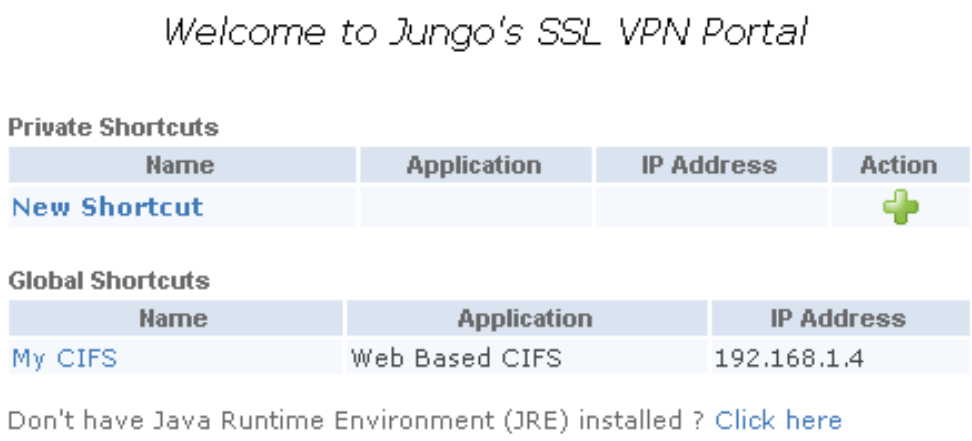


Figure 7.401. Shortcut to Application

If you had not specified a share directory name when configuring the shortcut, the link will lead you to the base directory of the host with the specified IP address:

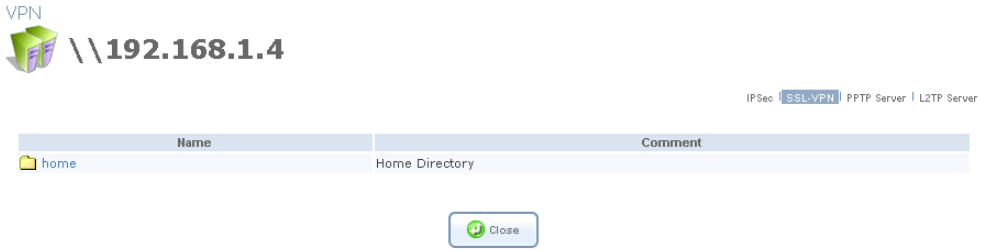


Figure 7.402. Web-based CIFS Host

If you had specified a share directory name when configuring the shortcut (in this example--"home"), the link will lead you to the share directory on the specified host:

Figure 7.403. Web-based CIFS Share

The directory content is displayed, with the file name, size, last modification and actions you may perform on the file. You can browse the directory contents and sort the columns according to the file name, size or modification date. The action icons for each file and directory allow you to perform the following:

- Download -- The directories are downloaded in ***.tar** format.
- Rename
- Copy to clipboard
- Remove

You can perform additional actions using the drop down list (see figure Figure 7.404):

- Upload a file
- Upload a directory - The directories are uploaded in ***.tar** format.
- Create a new directory
- Paste from clipboard

Figure 7.404. Web-based CIFS Actions

7.10.2.3.2. CIFS

This option enables the user to open a Common Internet File System (CIFS) application with a computer inside OpenRG's LAN. Configure the following parameters:

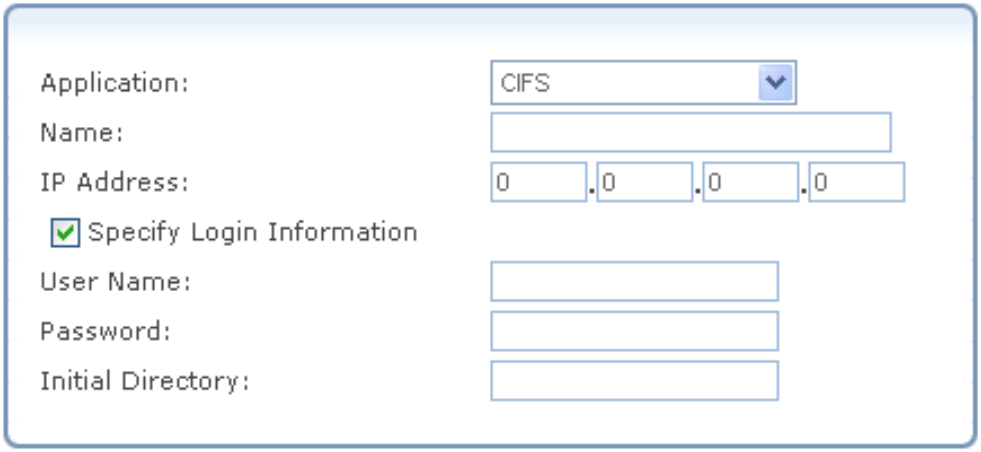


Figure 7.405. CIFS Parameters

Name Enter a name for this shortcut.

IP Address Enter the IP address of the LAN computer on which to perform the application.

Specify Login Information If the LAN computer requires a login, specify the following parameters to auto-login when launching the application:

User Name The user name with which to login.

Password The password with which to login.

Initial Directory Specify the root directory on which to perform the application. For example, **A/**, **C:\Program Files**, etc.

7.10.2.3.3. Remote Desktop (RDP)

This option enables the user to open a Microsoft Remote Desktop application on a computer inside OpenRG's LAN. Configure the following parameters:

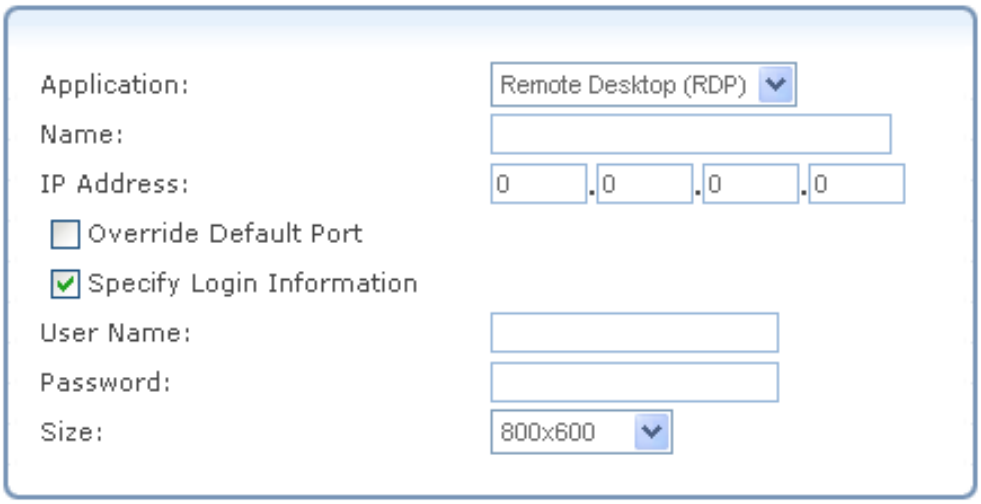


Figure 7.406. Remote Desktop Parameters

Name Enter a name for this shortcut.

IP Address Enter the IP address of the LAN computer on which to perform the application.

Override Default Port Select this option if the LAN computer uses a port other than the application's "well known" default port. An additional field appears, in which you must enter the alternative port.

Specify Login Information If the LAN computer requires a login, specify the following parameters to auto-login when launching the application:

User Name The user name with which to login.

Password The password with which to login.

Size Select the size of the screen in which the remote desktop application will be displayed.

7.10.2.3.4. VNC

This option enables the user to open a Virtual Network Connection (VNC) application with a computer inside OpenRG's LAN. Configure the following parameters:

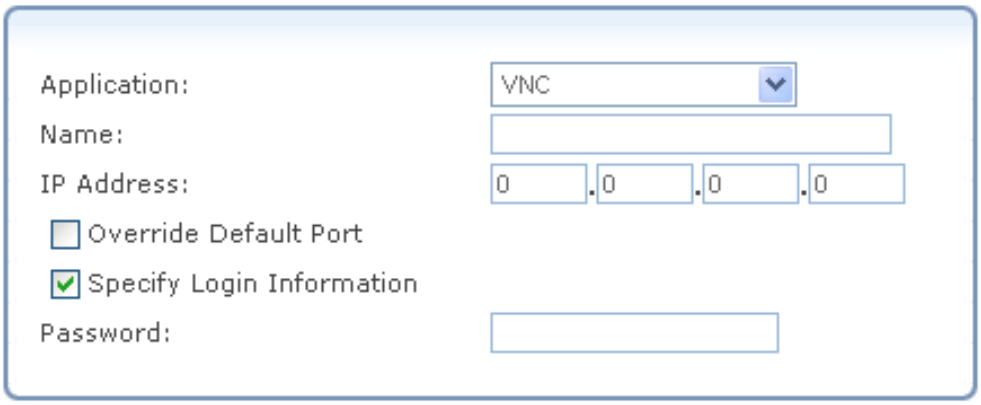


Figure 7.407. VNC Parameters

Name Enter a name for this shortcut.

IP Address Enter the IP address of the LAN computer on which to perform the application.

Override Default Port Select this option if the LAN computer uses a port other than the application's "well known" default port. An additional field appears, in which you must enter the alternative port.

Specify Login Information If the LAN computer requires a login, specify the following parameter to auto-login when launching the application:

Password The password with which to login.

7.10.2.3.5. FTP

This option enables the user to open a File Transfer Protocol (FTP) application with a computer inside OpenRG's LAN. Configure the following parameters:

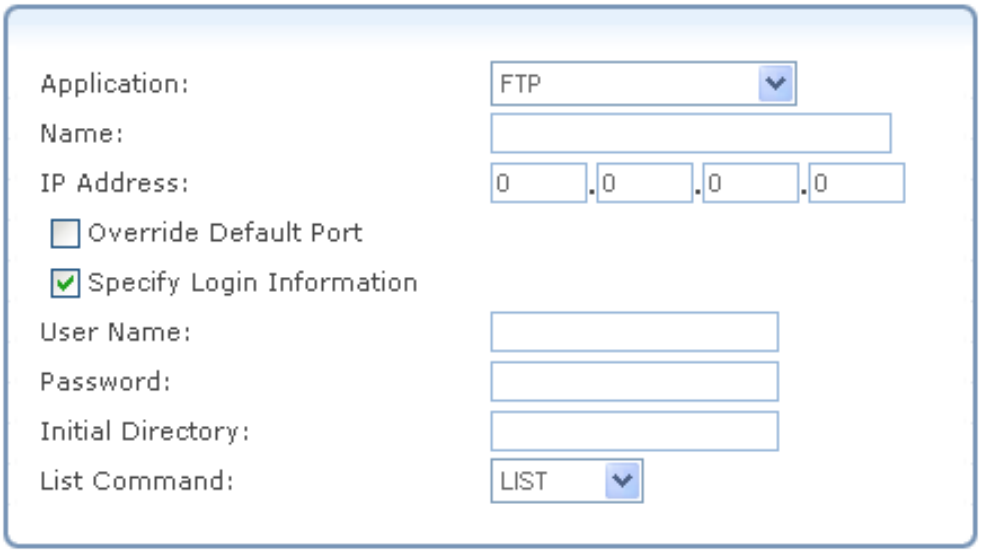


Figure 7.408. FTP Parameters

Name Enter a name for this shortcut.

IP Address Enter the IP address of the LAN computer on which to perform the application.

Override Default Port Select this option if the LAN computer uses a port other than the application's "well known" default port. An additional field appears, in which you must enter the alternative port.

Specify Login Information If the LAN computer requires a login, specify the following parameters to auto-login when launching the application:

User Name The user name with which to login.

Password The password with which to login.

Initial Directory Specify the root directory on which to perform the application. For example, **A/**, **C:\Program Files**, etc.

List Command Select the FTP command that determines the list of files and their properties available for FTP. You should only change this option if the LAN computer does not support the default "LIST" command.

7.10.2.3.6. Telnet

This option enables the user to connect with the Telnet application to a computer inside OpenRG's LAN. Configure the following parameters:

Figure 7.409. Telnet Parameters

Name Enter a name for this shortcut.

IP Address Enter the IP address of the LAN computer on which to perform the application.

7.10.2.4. Connecting to a LAN Computer with SSL VPN

This section demonstrates using SSL VPN by remotely connecting to a computer inside OpenRG's LAN using the Telnet application.

7.10.2.4.1. Configuring the Application

Configure the Telnet application for a user:

1. Click the 'SSL VPN' icon in the 'Advanced' screen. The 'SSL VPN' screen appears:

Figure 7.410. SSL VPN

2. Select the 'Enabled' check-box.

3. Click the 'Click Here to Allow Incoming HTTPS Access' link, select either HTTPS port 443 or 8443 (or both), and click 'OK':

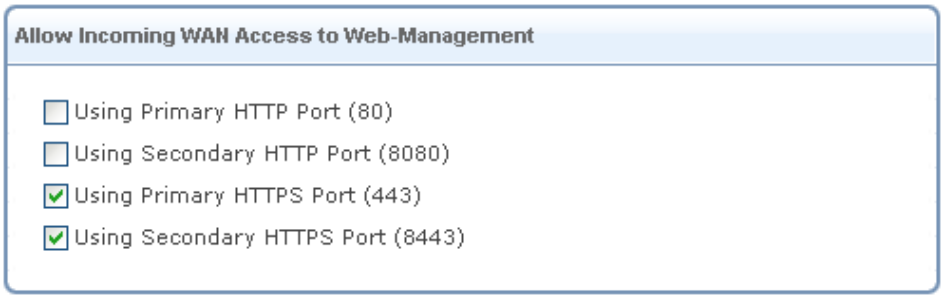

Allow Incoming WAN Access to Web-Management
Using Primary HTTP Port (80)
Using Secondary HTTP Port (8080)
Using Primary HTTPS Port (443)
Using Secondary HTTPS Port (8443)

Figure 7.411. Remote Administration Ports

4. Click the 'Click Here to Create SSL-VPN Users' link and define a user with the 'Remote Access by SSL VPN' option enabled.

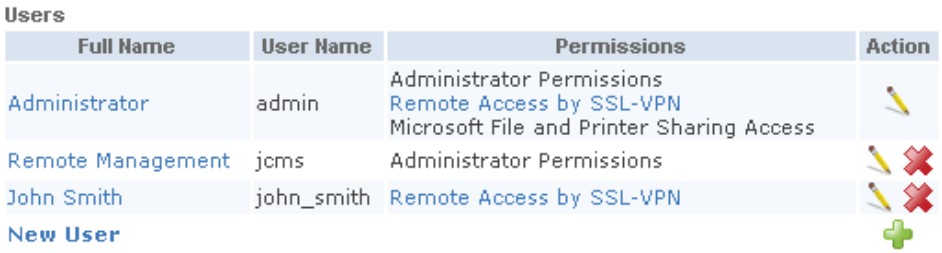


Figure 7.412. New User

5. Back in the 'SSL VPN' screen, click the 'New Shortcut' link. The 'Shortcut Wizard' screen appears:

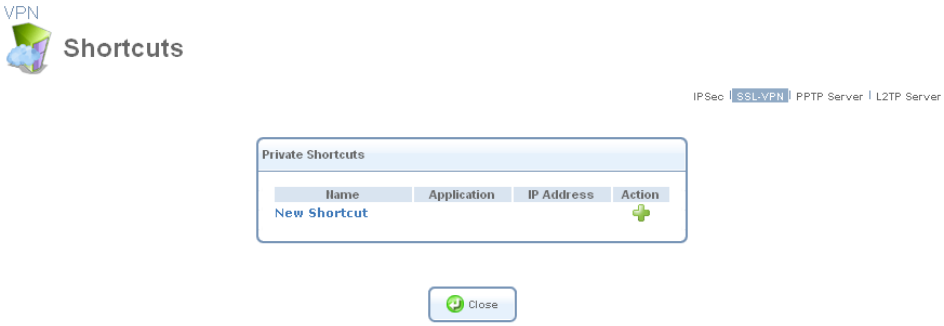


Figure 7.413. New Shortcut

6. Select the 'Manual Selection' check box, and click 'Next'. The next 'Shortcut Wizard' screen appears:

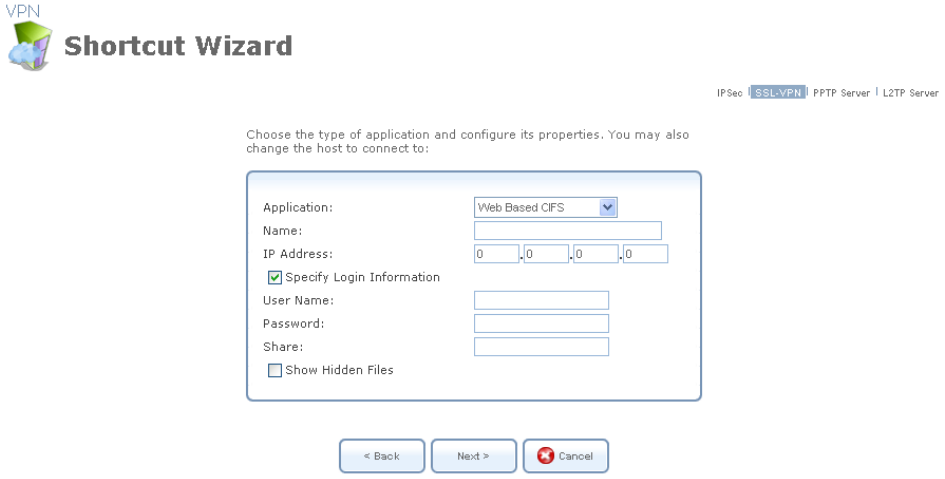


Figure 7.414. Select and Configure an Application

7. By default, 'Web Based CIFS' is the selected application. Select 'Telnet'. The screen refreshes, displaying the Telnet parameters:

Figure 7.415. Telnet Parameters

8. Enter a name for the shortcut.

9. Enter the IP address of the LAN computer to which the Telnet will be performed, and click 'Next'. The 'Shortcut Summary' screen appears:

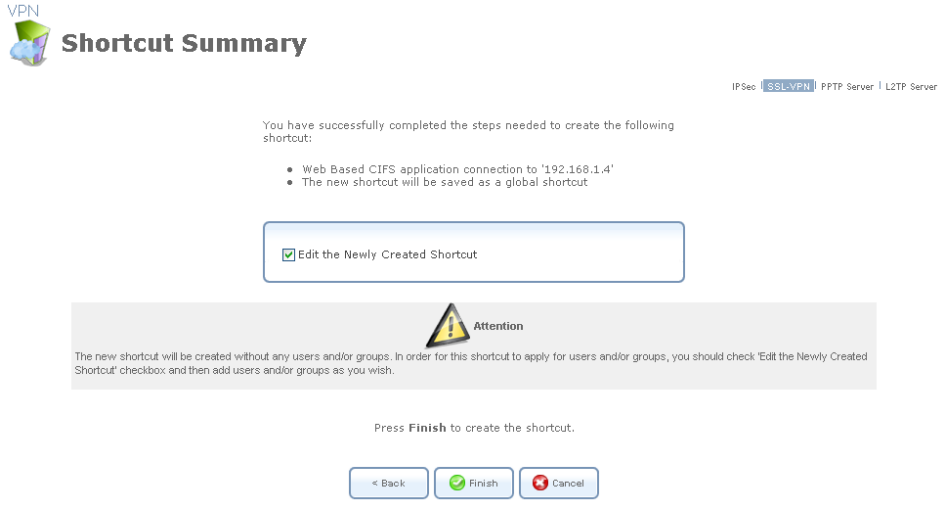

VPN
Shortcut Summary
IPSec | SSL-VPN | PPTP Server | L2TP Server
You have successfully completed the steps needed to create the following shortcut:
Web Based CIFS application connection to '192.168.1.4'
The new shortcut will be saved as a global shortcut
Edit the Newly Created Shortcut
Attention
The new shortcut will be created without any users and/or groups. In order for this shortcut to apply for users and/or groups, you should check 'Edit the Newly Created Shortcut' checkbox and then add users and/or groups as you wish.
Press Finish to create the shortcut.
< Back
Finish
Cancel

Figure 7.416. Shortcut Summary

1. Check the 'Edit the Newly Created Shortcut' check box in order to associate a user or a group with this shortcut, and click 'Finish'. The 'Edit Shortcut' screen appears:

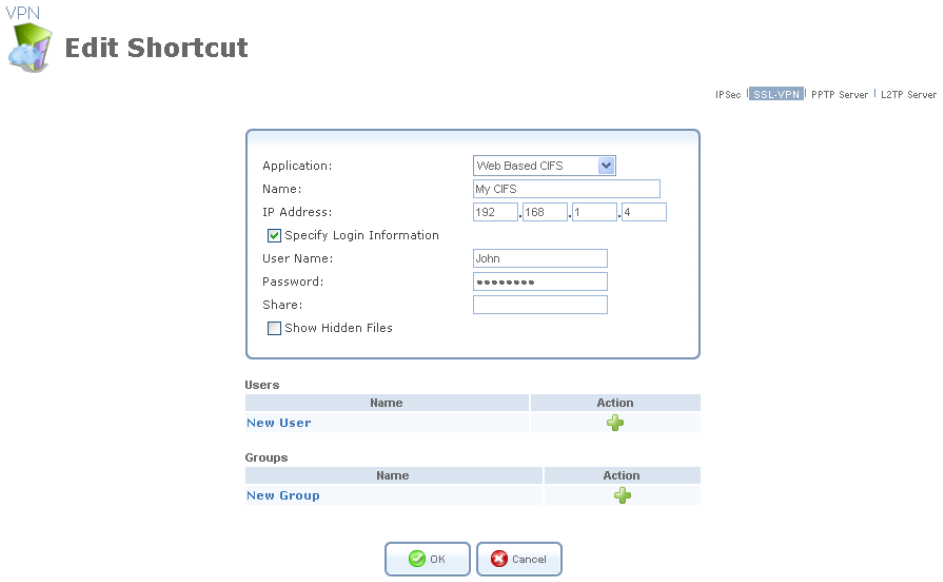


Figure 7.417. Edit Shortcut

2. Click the 'New User' link (or 'New Group' according to your preference), and select a user with remote SSL VPN access permission from the combo box:

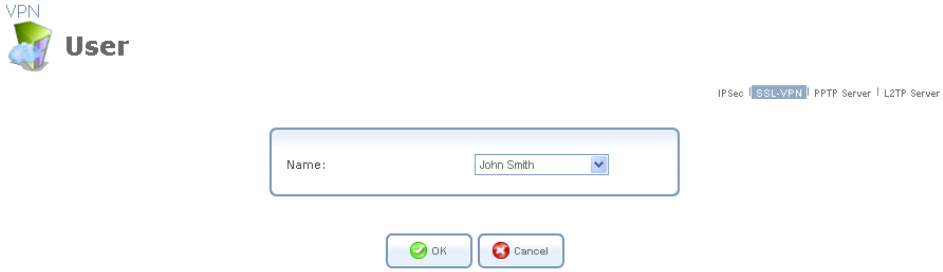


Figure 7.418. User

3. Click 'OK'. The new user is added to the 'Users' section in the 'Edit Shortcut' screen:

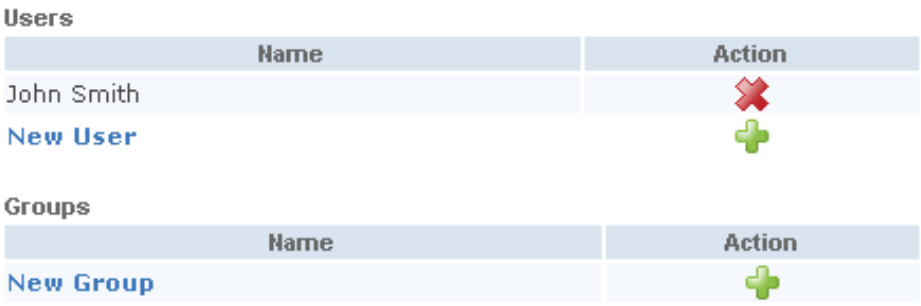


Figure 7.419. Associated User

4. Click 'OK' to save the settings.

Figure 7.420. New Telnet Shortcut

7.10.2.4.2. Using the Application

Launch the Telnet application from a remote computer:

1. Login to OpenRG with the newly added user. Since this user has only SSL VPN remote access permissions, the portal screen appears, displaying a shortcut to the Telnet application:

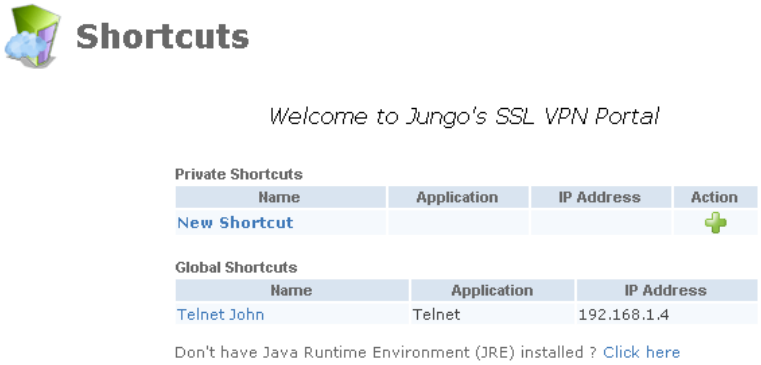


Figure 7.421. SSL VPN Portal

2. Click the shortcut link. A Telnet session screen will open (see figure Figure 7.422). If such a screen fails to load, check that JRE is properly installed on the client computer.

Figure 7.422. Telnet Session

7.10.3. Point-to-Point Tunneling Protocol Server

OpenRG can act as a Point-to-Point Tunneling Protocol Server (PPTP Server), accepting PPTP client connection requests.

7.10.3.1. Configuring the PPTP Server

Access this feature either from its link in the 'VPN' tab under the 'Services' screen, or by clicking the 'PPTP Server' icon in the 'Advanced' screen. The 'Point-to-Point Tunneling Protocol Server (PPTP Server)' screen appears:

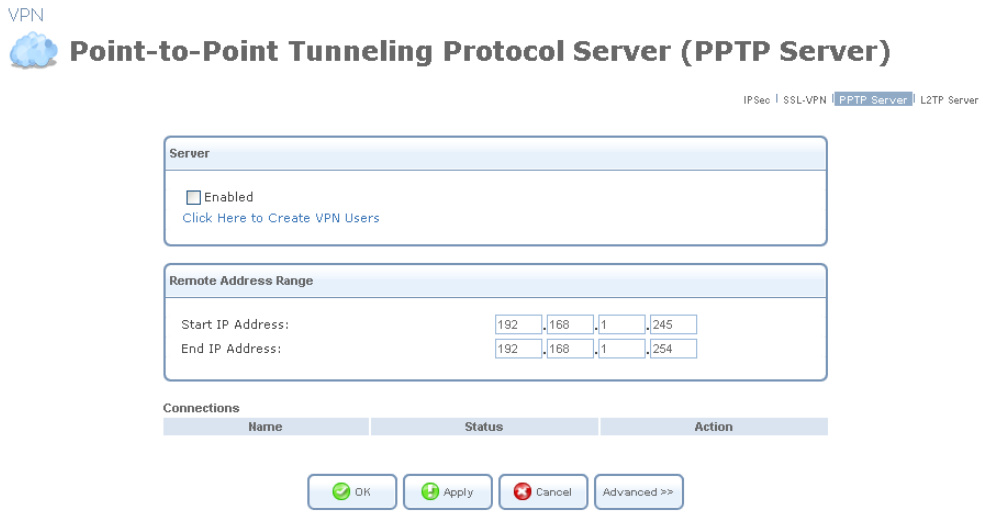


Figure 7.423. Point-to-Point Tunneling Protocol Server (PPTP Server)

This screen enables you to configure:

Enabled Check or un-check this box to enable or disable this feature.
Note that checking this box creates a PPTP server (if not yet created with the wizard), but does not define remote users.

Click Here to Create VPN Users Click this link to define remote users that will be granted access to your home network. Refer to Section 8.3 to learn how to define and configure users.

Remote Address Range Use the 'Start IP Address' and 'End IP Address' fields to specify the range of IP addresses that will be granted by the PPTP server to the PPTP client.

7.10.3.2. Advanced PPTP Server Settings

To configure advanced PPTP server settings press the 'Advanced' button on the PPTP screen (see figure Figure 7.423). The screen expands, offering additional settings:

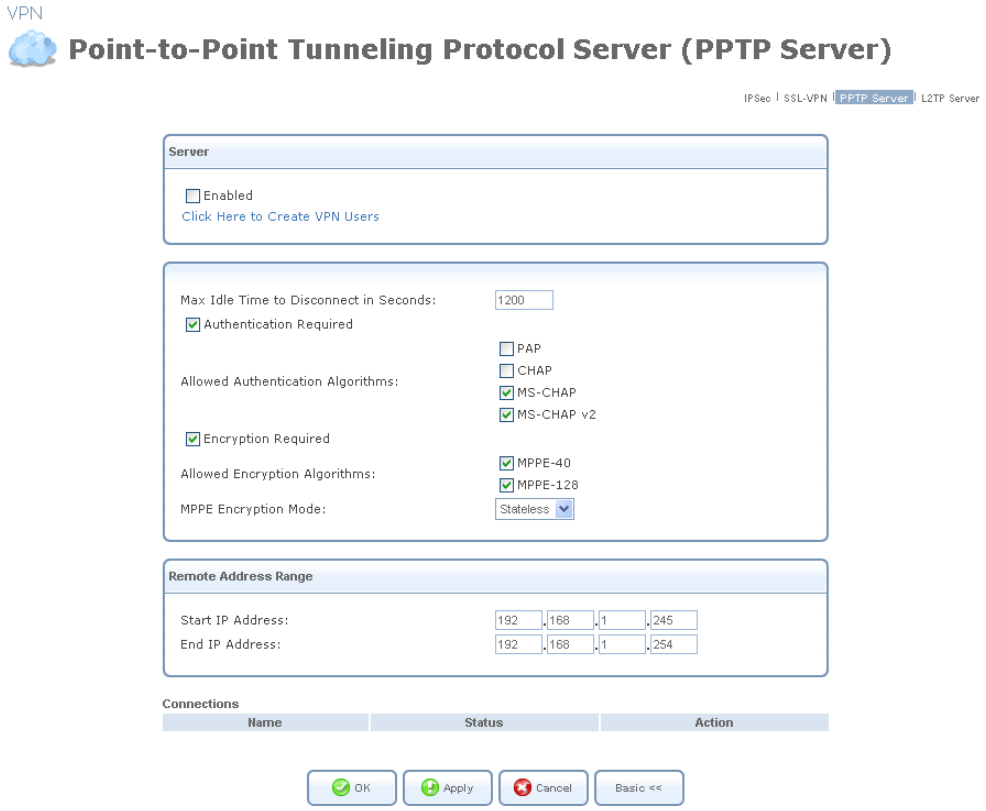


Figure 7.424. Advanced PPTP Server Parameters

Maximum Idle Time to Disconnect in Seconds Specify the amount of idle time (during which no data is sent or received) that should elapse before the gateway disconnects a PPTP connection.

Authentication Required Select whether PPTP will use authentication.

Allowed Authentication Algorithms Select the algorithms the server may use when authenticating its clients.

Encryption Required Select whether PPTP will use encryption.

Allowed Encryption Algorithms Select the algorithms the server may use when encrypting data.

MPPE Encryption Mode Select the Microsoft Point-to-Point Encryption mode: stateless or stateful.
Please note that the server settings must be in tune with the client settings, described in section Section 8.4.12 .

7.10.4. Layer 2 Tunneling Protocol Server

OpenRG can act as a Layer 2 Tunneling Protocol Server (L2TP Server), accepting L2TP client connection requests.

7.10.4.1. Configuring the L2TP Server

Access this feature either from its link in the 'VPN' tab under the 'Services' screen, or by clicking the 'L2TP' icon in the 'Advanced' screen. The 'Layer 2 Tunneling Protocol Server (L2TP Server)' screen appears:

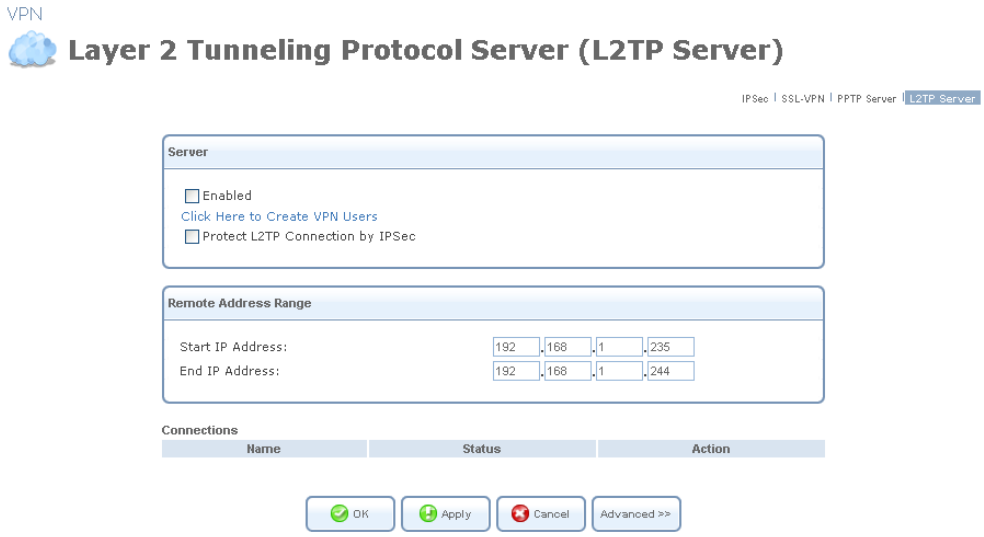


Figure 7.425. Layer 2 Tunneling Protocol Server (L2TP Server)

This screen enables you to configure the following:

Enabled Check or un-check this box to enable or disable this feature.
Note that checking this box creates an L2TP server (if not yet created with the wizard), but does not define remote users.

Click Here to Create VPN Users Click this link to define remote users that will be granted access to your home network. Refer to Section 8.3 to learn how to define and configure users.

Protect L2TP Connection by IPSec By default, the L2TP connection is not protected by the IP Security (IPSec) protocol. Check this option to enable this feature. When enabled, the following entry appears.

Create Default IPSec Connection When creating an L2TP Server with the connection wizard, a default IPSec connection is created to protect it. If you wish to disable this feature, uncheck this option. However, note that if L2TP protection is enabled by IPSec (see previous entry), you must provide an alternative, active IPSec connection in order for users to be able to connect. When this feature is enabled, the following entry appears.

L2TP Server IPSec Shared Secret You may change the IPSec shared secret, provided when the connection was created, in this field.

Remote Address Range Use the 'Start IP Address' and 'End IP Address' fields to specify the range of IP addresses that will be granted by the L2TP server to the L2TP client.

7.10.4.2. Advanced L2TP Server Settings

To configure advanced L2TP server settings press the 'Advanced' button on the L2TP screen (see figure Figure 7.425). The screen will expand, offering additional settings:

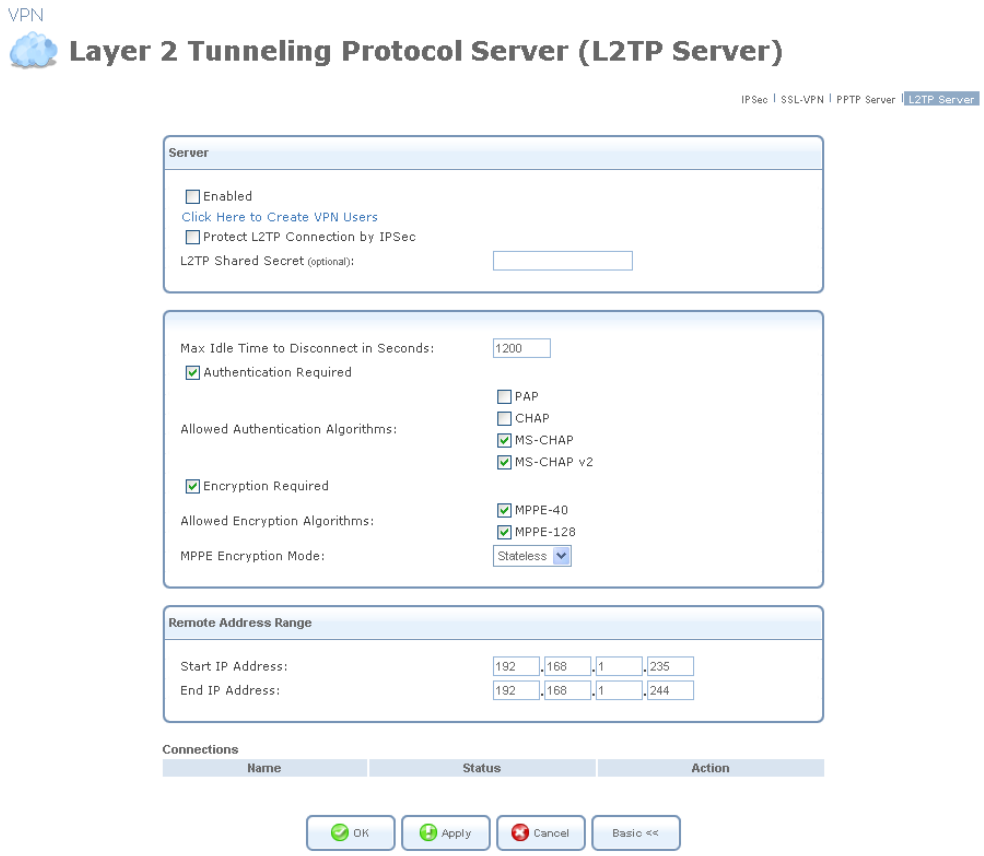


Figure 7.426. Advanced L2TP Server Parameters

L2TP Shared Secret (optional) Use this optional field to define a shared secret for the L2TP connection, for added security.

Maximum Idle Time to Disconnect in Seconds Specify the amount of idle time (during which no data is sent or received) that should elapse before the gateway disconnects a L2TP connection.

Authentication Required Select whether L2TP will use authentication.

Allowed Authentication Algorithms Select the algorithms the server may use when authenticating its clients.

Encryption Required Select whether L2TP will use encryption.

Allowed Encryption Algorithms Select the algorithms the server may use when encrypting data.

MPPE Encryption Mode Select the Microsoft Point-to-Point Encryption mode: stateless or stateful.
Please note that the server settings must be in tune with the client settings, described in section Section 8.4.10 .

7.11. Storage

7.11.1. FTP Server

OpenRG can operate as a File Transfer Protocol (FTP) server, allowing users and guests to access its internal disks, to easily (but securely) exchange files. OpenRG's FTP access consists of two levels:

- User Access Registered users can access predefined directories, which are protected by their username and password.

- Anonymous Access Guests can access predefined public directories. This feature allows you, for example, to let guests download a certain file.

7.11.1.1. User Access FTP

To configure an FTP user, perform the following:

1. Click the 'Users' icon in the 'Advanced' screen of the management console. The 'Users' screen appears.

Figure 7.427. Users

2. Click the edit icon of the user for which you would like to grant FTP access. The 'User Settings' screen appears.

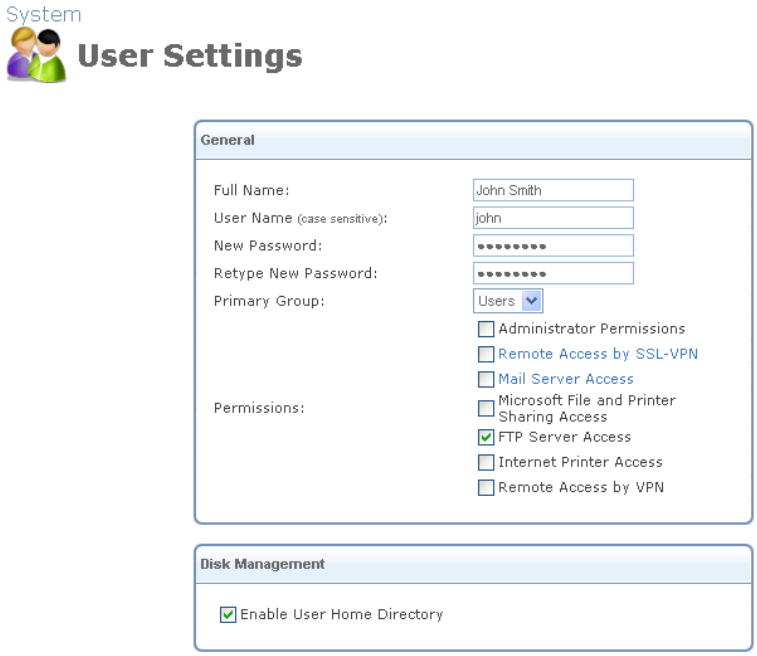


Figure 7.428. User Settings

3. In this screen, perform the following:

    1. In the Permissions section, check the 'FTP Server Access' check box, to grant this permission.

2. Check the 'Enable User Home Directory' check box. This feature creates a home directory for the user.

4. Click 'OK' to save the settings.

5. Access the FTP Server settings either from the 'Storage' tab under the 'Services' screen, or by clicking the 'FTP Server' icon in the 'Advanced' screen. The 'FTP server' screen appears. Check the 'Enabled' check box to view the full FTP screen.

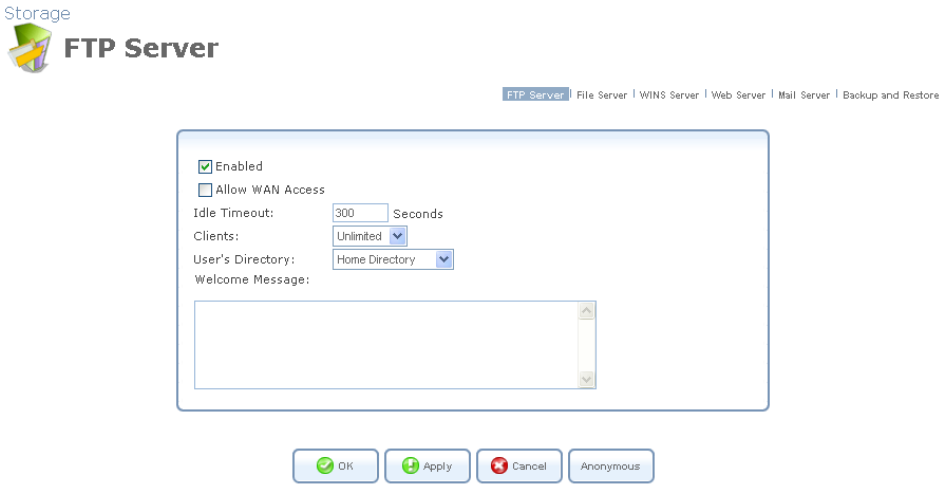


Figure 7.429. Enabled FTP Server

6. In this screen, perform the following:

   1. Check the 'Allow WAN Access' check box if you wish to allow registered users to use the FTP from the WAN.

   2. Enter the maximum number of seconds that a user may spend between FTP commands before the session times out, in the 'Idle Timeout' field. This setting is global for all users, both registered and guests.

   3. Choose the maximum number of users that can use the FTP simultaneously. You can choose between "Unlimited" and "Maximum" in the 'Clients' combo box. When choosing 'Maximum', a second field appears allowing you to enter the number of users. This setting is also global.

   4. In the 'User's Directory' combo box, choose 'Home Directory' to allow registered users to access their home directories. Alternatively choose 'Common Directory'. A second field will appear in which you should specify a common directory relative to '<User Data>/'. All registered users will be able to access this directory only.

   5. Enter a welcome message that will be displayed for all users after logging in (optional).

7. Click 'OK' to save the settings.

7.11.1.2. Anonymous Access FTP

To configure an anonymous or guest FTP user, perform the following:

1. Click the 'Anonymous' button at the bottom of the 'FTP Server' screen (see figure Figure 7.429). The 'Anonymous Access' screen will appear (see figure Figure 7.430).

2. Check the 'Allow LAN/WAN Access' check boxes to allow guests FTP access to the LAN or the WAN, or both. A second field appears labeled 'LAN/WAN Root Directory'. The default directory is { home/ftp}, which

is OpenRG's pre-configured directory with guest permissions and the usernames "ftp" and "anonymous" (any passwords will be accepted).

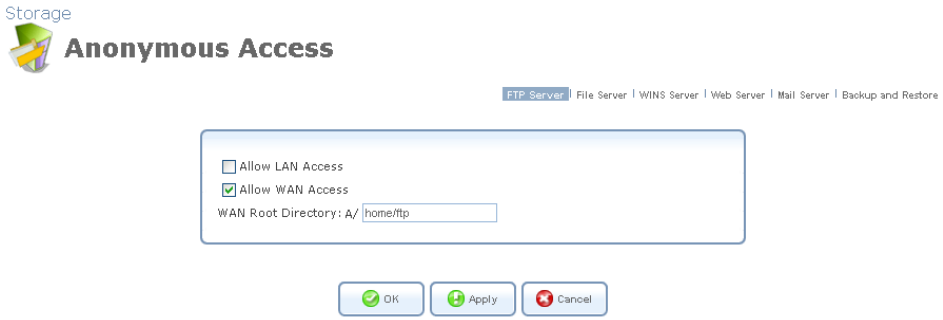


Figure 7.430. Anonymous Access

3. Click 'OK' to save the settings.

Note: The FTP Server assumes that any path or directory that you enter during the configuration exists. Each file in the directory should have the correct permissions for the relevant user. Files in the anonymous directories should have the relevant permissions for the built-in 'ftp' user.

7.11.2. File Server

OpenRG provides a file server utility, allowing you to perform various tasks on your files, such as manage file server shares and define access control lists. The file server utility complements OpenRG's disk management (see section Section 6.4).

Access the File Server settings either from its link in the 'Storage' tab under the 'Services' screen, or by clicking the 'File Server' icon in the 'Advanced' screen. The 'File Server' screen appears.

Figure 7.431. File Server

Enabled Check or un-check this box to enable or disable this feature.

NetBIOS Workgroup OpenRG's workgroup name that will be displayed in the Windows network map of LAN hosts.

Automatically Share All Partitions A partitioned storage device connected to OpenRG is automatically displayed and shared by all LAN computers. This feature is enabled by default.

Allow Guest Access From the drop-down menu, select a permission level, according to which the LAN users will access the share:

Read/Write Every LAN user can read and write the shared files without authentication.

Read Only Every LAN user can only read the shared files.

Disabled LAN users must authenticate themselves, in order to access the share. They will be able to use the share according to their permissions defined in OpenRG's 'User Settings' screen.

File Server Shares Define file shares on your disk partitions, as depicted in the following sections.

7.11.2.1. Automatic File Sharing

By default, all partitions are automatically shared and displayed. Figure Figure 7.431 depicts such a scenario, where a share entry (with a default name "share1") appears in the 'File Server Shares' section as soon as a partitioned and formatted storage device is connected to your gateway. If you wish to share specific directories or partitions, perform the following: Figure 7.431

1. Deselect the 'Automatically Share All Partitions' option and click 'Apply'. The list of all automatically shared partitions disappears.

Figure 7.432. Disabled Automatic Partition Sharing

2. Click the 'New Entry' link to define a new share. The 'File Server Share Settings' screen appears.

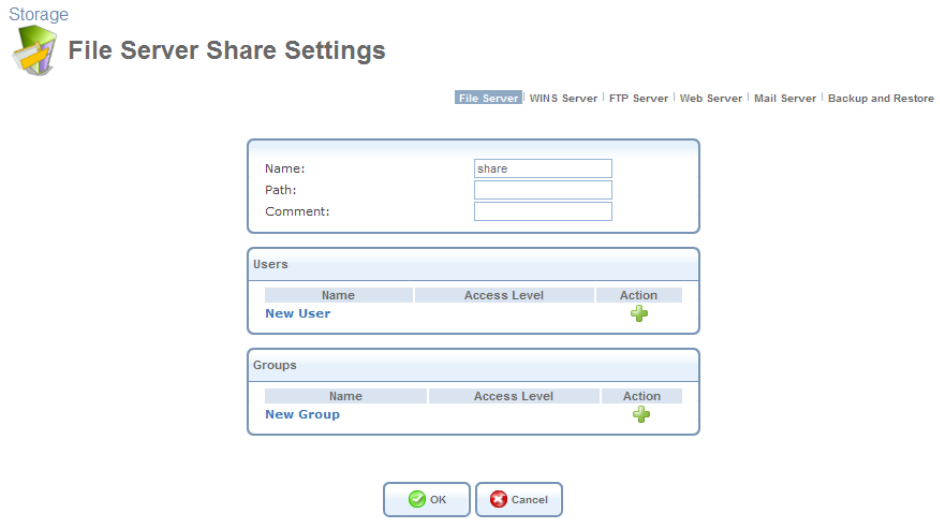


Figure 7.433. File Server Share Settings

3. Enter the share's name, path, and (optionally) comment.

> Note: The default name "share" can be changed to another one. The share's name is not case sensitive. Even if entered in upper-case letters, the name will be displayed in lower case, after saving the setting.

4. Associate a user or group of users with the share, to grant them access to the shared files. To learn how to do so, refer to section Section 7.11.2.2 .

5. Click 'OK' to save the settings.

Click the share's name to view its content. The screen refreshes as the share is accessed.

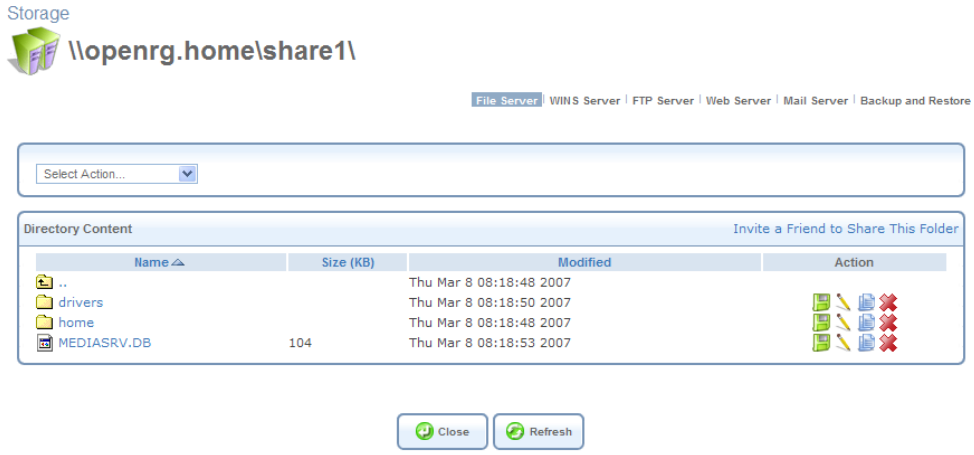


Figure 7.434. File Server Share

This screen enables you to view and modify the content of your file share. In the upper section of this screen, you can modify your file share by adding files or directories to it. Use the drop-down menu to select an action.

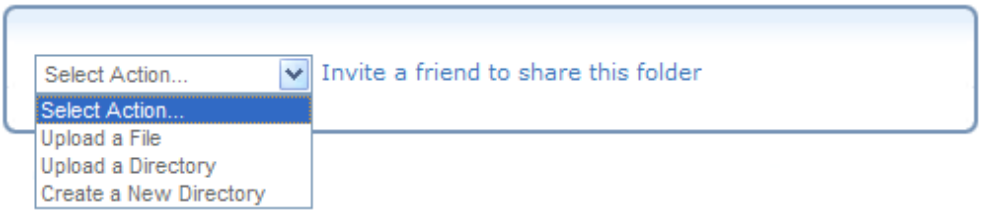


Figure 7.435. File Share Actions

- **Upload a File** ---select this option to upload a file to the share. The screen refreshes.

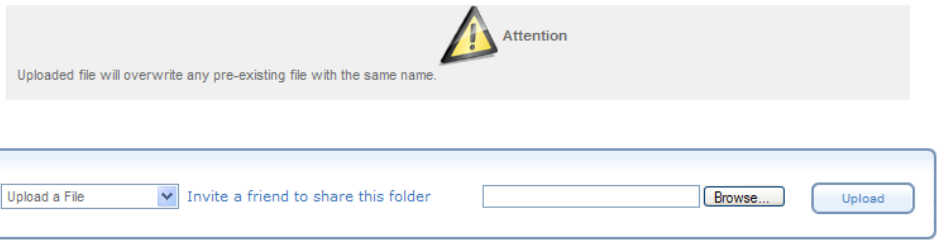

Attention
Uploaded file will overwrite any pre-existing file with the same name.
Upload a File
Invite a friend to share this folder
Browse...
Upload

Figure 7.436. Upload a File to the Share

Enter the location of the file to upload, or click the Browse button to browse for the file. Click the Upload button to upload the file.

- **Upload a Directory** ---in the same manner, you can upload an entire directory of files to the file share.
- **Create a new Directory** ---you can also create a new directory by simply typing its name and clicking 'Go'.

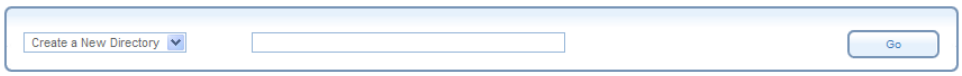


Figure 7.437. Create a New Directory

The lower section of the screen displays your share's content. You can click the different directory names to access them, or you can download, rename, copy or remove the directories using the standard action icons.

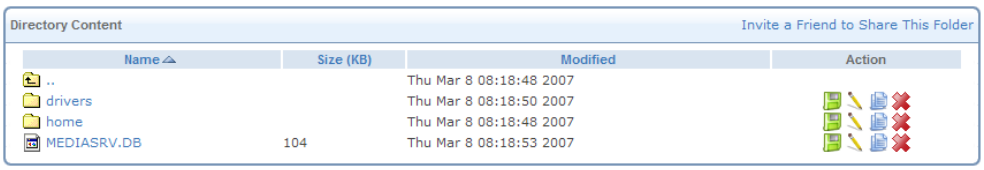


Figure 7.438. File Share Content

If your gateway is connected to the Jungo.net portal (refer to section Section 7.2), the **Invite a Friend to Share This Folder** link appears in the right corner of this section. This link enables you to invite remote users to access your shares over the Internet (refer to section Section 7.11.2.3). Whenever an invitation is sent, its log appears in the 'File Server Shares' section of the screen.

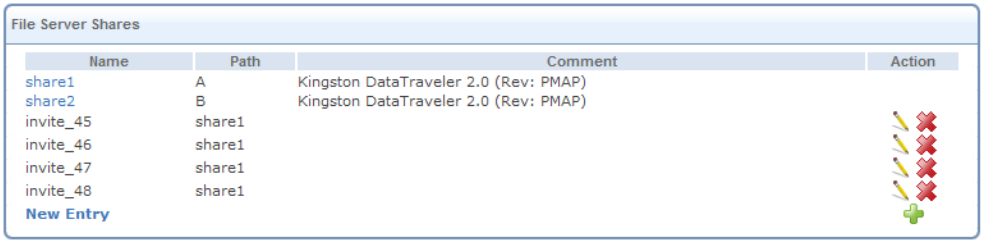


Figure 7.439. Remote File Access Invitations

For a detailed view of an invitation, click its action icon . To remove an invitation from a list, click its action icon . This will also cancel the invitation. If you removed an invitation by mistake, you can recover it by clicking the 'Reconfigure My Settings' button in the Jungo.net portal's 'Account' screen. The Jungo.net portal will reconfigure your gateway, and the removed invitation will reappear in the list. For more information, refer to the Jungo.net User Manual.

7.11.2.2. Microsoft File Sharing

You can disable the automatic file sharing feature by unchecking the 'Automatically share all partitions' check box (see figure Figure 7.431), and manually define file shares using the 'Microsoft File Sharing Protocol' on OpenRG's partitioned storage device. First, enable Microsoft File Sharing for each user:

1. Click the 'Users' icon in the 'Advanced' screen of the management console. The Users screen will appear (see figure Figure 7.440).

Figure 7.440. Users

2. Click the name of the user for whom you wish to enable file sharing.

3. In the 'User Settings' screen that appears, check the "Microsoft File and Printer Sharing Access" check box in the Permissions section (see figure Figure 7.441).

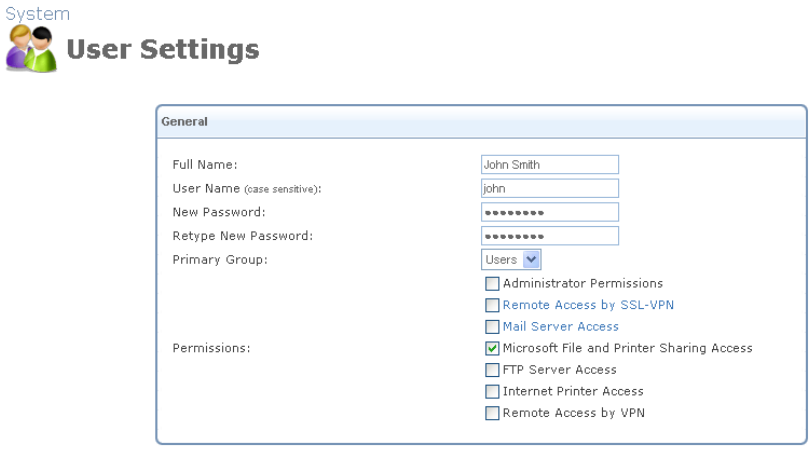


Figure 7.441. User Settings

4. Click 'OK' to save the settings.

Next, define file shares:

1. Click the 'File Server' icon in the 'Advanced' screen of the management console.
2. Click the 'New Entry' link in the 'File Server Shares' section. The 'File Server Share Settings' screen will appear (see figure Figure 7.442).

Figure 7.442. File Server Share Settings

3. In this screen:
   1. Enter a name for the share in the 'Name' field.
   2. Enter a valid partition path (e.g. A, B/my_documents) in the 'Path' field.

      Note: If a drive's sub directory does not exist already, you will have to create it as soon as the share is defined and accessible.

   3. You may add a comment in the 'Comment' field.

4. In the 'Users' section, click the 'New User' link to allow a user to use the share.

5. In the 'User' screen that appears (see figure Figure 7.443), choose the user and the allowed access level in the combo boxes, and click 'OK'.

Figure 7.443. User Access Settings

You can also allow a group of users to use the share, in the same manner, in the 'Groups' section.

4. Click 'OK' to save the settings.

5. The 'File Server' screen will reappear, displaying the new share in the 'File Server Shares' section (see figure Figure 7.444).

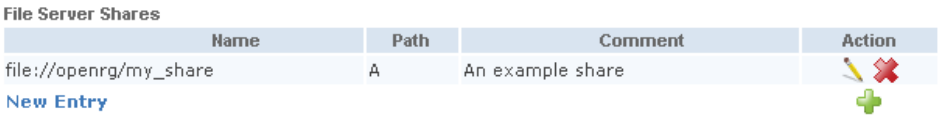


Figure 7.444. File Server Shares Section

You can now access the file share. However, note that access to a file share is different for FAT32, NTFS, and EXT2/3 formatted partitions. FAT32 has no restrictions---any user can access any share for both reading and writing. On the other hand, the data stored on NTFS partitions is only readable (unless OpenRG is based on the Conexant Solos, Mindspeed Malindi2 or Freescale platforms). In addition, shares defined on EXT2/3 partitions are only readable to non-administrator users (even with writing permissions), with the following exceptions:

- The user will be able to write to the share's root directory (e.g. A\, my_share\).

- The user will be able to write to his/her home directory, if such had been created for that user, by enabling the 'Enable User Home Directory' option in the 'User Settings' screen (see figure Figure 7.441).

Moreover, to create new directories that will be writable for users, you must be logged in as a user, not an administrator. Any directories created by an administrator will only be writable to the administrator. To access the new share from OpenRG:

1. Click the share's link [1] under the Name column in the 'File Server Shares' section (see figure Figure 7.444). A Windows login dialog box will appear (see figure Figure 7.445).

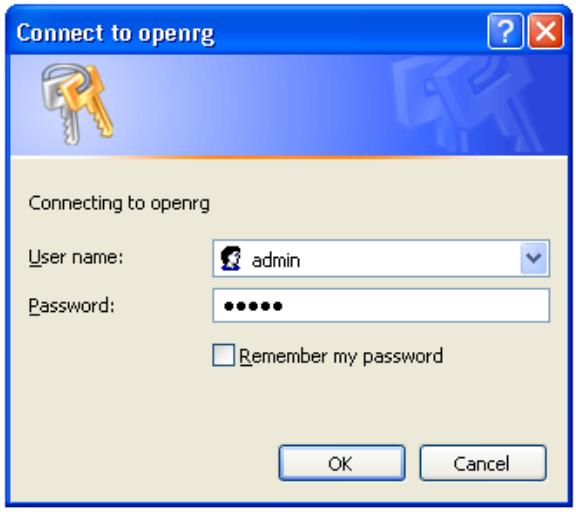


Figure 7.445. Login Dialog

2. Enter your OpenRG username and password to login (non administrator users must have file access permission in order to access the share). The share will open in a new window (see figure Figure 7.446).

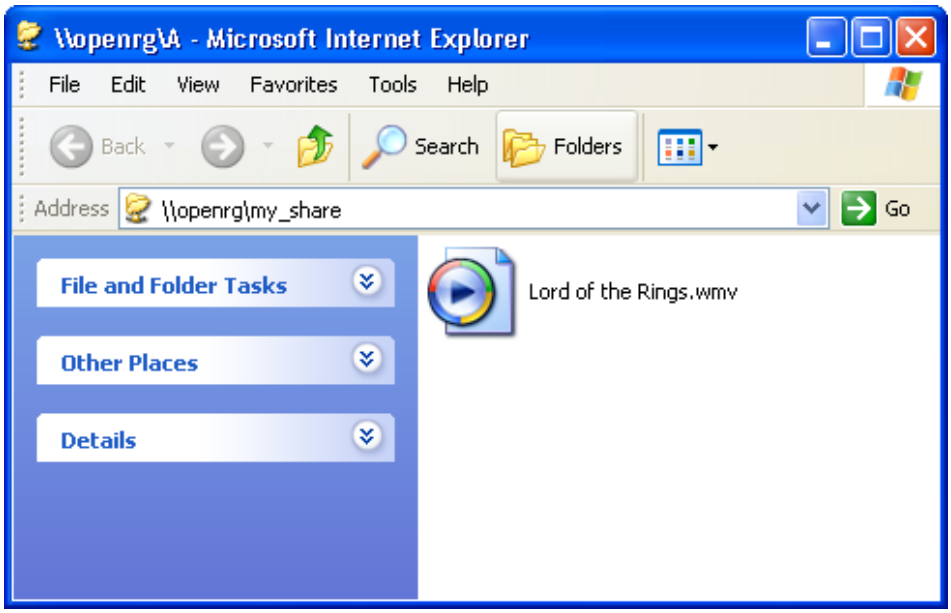


Figure 7.446. File Share

Once logged in to a share, Windows will "remember" your username and password, and automatically re-login with the same user. To logout and re-login with a different user (for example, to switch between an administrator and a user), either logout and re-login to Windows, or type the following command in the command line: '`net`

`use /del *`'. Users with appropriate permissions can access file shares from any PC on the LAN using the following standard methods:

- From OpenRG's Web-based management as described above.
- Browsing to the share itself by simply typing its path (for example, openrg\A) in a browser address line or in the command line.
- Mapping the share using Window's 'Map Network Drive' utility.

All of the methods above will require an initial username and password login, as described above. The share content will be displayed in a new window. If the share is the partition configured to serve as the system storage area, it will contain automatically-generated system folders. Otherwise, it will either be empty or contain pre-loaded files.

7.11.2.3. Inviting Remote Users to Use File Shares

Once you have created file shares on your gateway's storage device, you can grant access to the content of these shares (or specific directories within them) to friends over the Internet. OpenRG utilizes the Jungo.net system to enable you to invite friends to view your files. This is done by sending invitation emails, allowing recipients access to your file shares. Before you can invite friends to access your file shares, verify the following:

- A storage device is connected to your gateway
- File shares are defined and contain directories you wish to share
- Your gateway is connected to Jungo.net (to learn how to create a Jungo.net account, refer to section Section 7.2).

To invite a friend to access your file shares, perform the following:

1. In the 'File Server' screen (see figure Figure 7.431), click the share's name. The screen refreshes as the share is accessed.

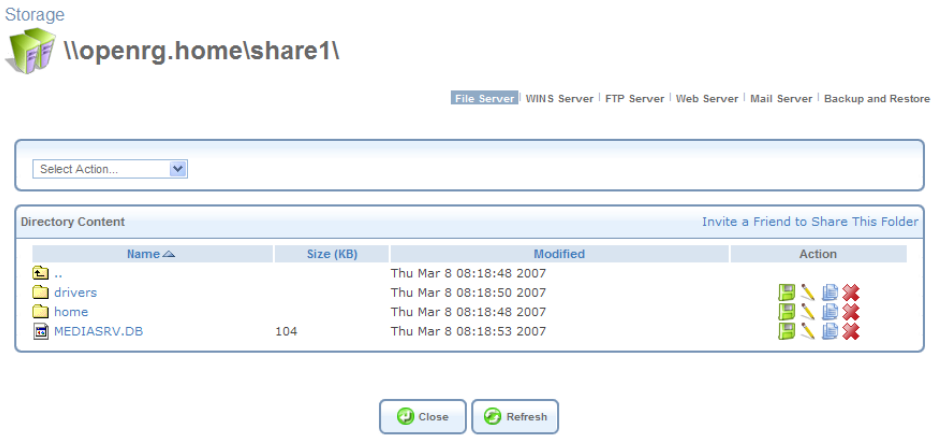


Figure 7.447. File Server Share

2. If you would like to share a specific directory, click its name to access it. Otherwise, click the 'Invite a friend to share this folder' link, to share the entire file server share. A new browser window opens.

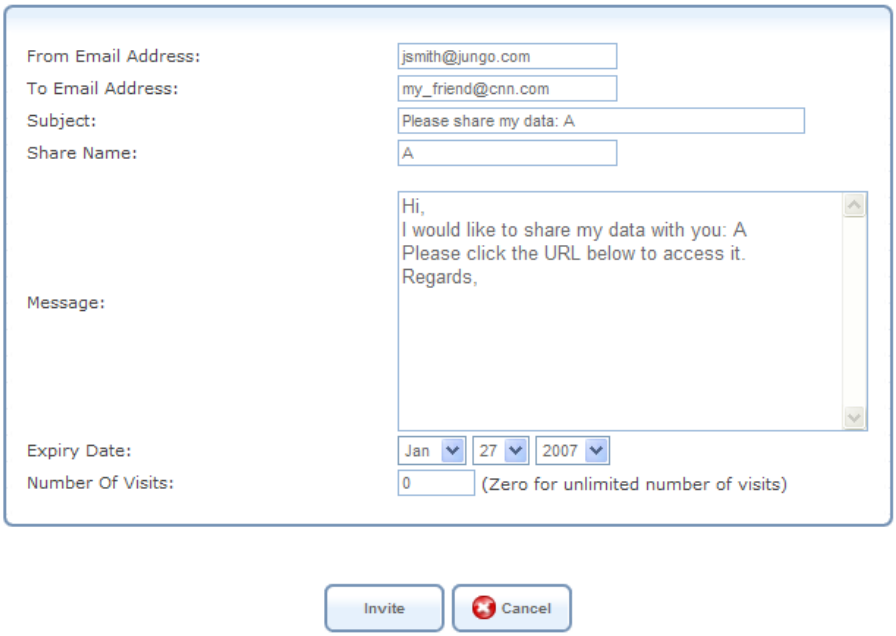


Figure 7.448. Invitation Form

In this form, verify the pre-filled details or enter new ones:

From Email Address Your email address.

To Email Address The email address of the person you would like to invite to access your file share content.

Subject A subject for the message.

Share Name The name of the share/directory to which access is granted (e.g. A, A/home).

Message You may write a textual message to your recipient.

Expiry Date Select a date on which access to the file share will be terminated (the default is one month).

Number Of Visits Specify the number of allowed visits to the share. Leave as zero for unlimited visits.

3. Click the 'Invite' button. The message is sent, and the following status screen appears.

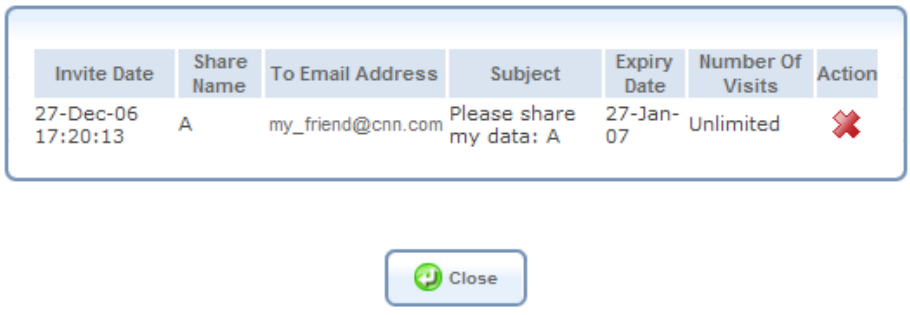


Figure 7.449. Invitation Status

Back in the 'File Server' screen, the invitation is displayed in the file server shares section. Note that clicking its link, even as an administrator, results in an "Access Denied" message, as only the intended recipient has the necessary permissions to access the share.

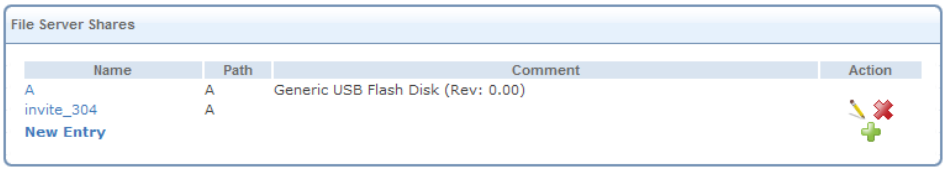


Figure 7.450. File Server Shares

Let's take a look at this from your friend's point of view: Your recipient will receive the following email message.

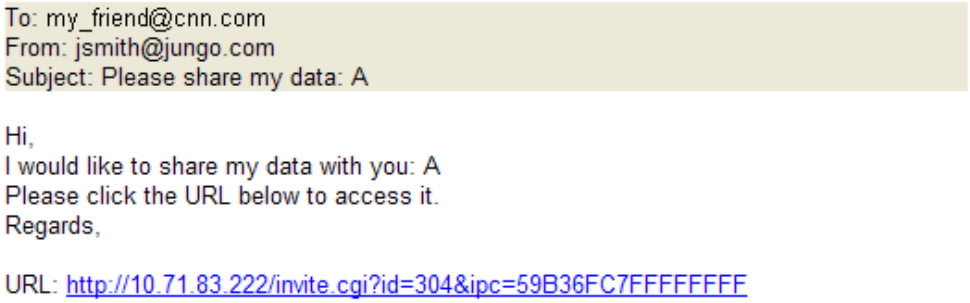

To: my_friend@cnn.com
From: jsmith@jungo.com
Subject: Please share my data: A
Hi,
I would like to share my data with you: A
Please click the URL below to access it.
Regards,
URL: http://10.71.83.222/invite.cgi?id=304&ipc=59B36FC7FFFFFFFF

Figure 7.451. Invitation Message

Clicking the link in this message opens a new browser window.

Figure 7.452. Shortcut to Share

To access the file share, the recipient must click the shortcut name, in this example "invite_304". The screen refreshes as the share is accessed.

Figure 7.453. Remote File Server Share

7.11.2.4. Access Control Lists

The Windows operating system boasts an extensive file permission scheme. When you right-click a file and choose Properties, you can see under the Security tab (see figure Figure 7.454) that file permissions can be defined for any number of users and groups. Each user and group may be allowed or denied several levels of access, ranging from Full Control to Read only.

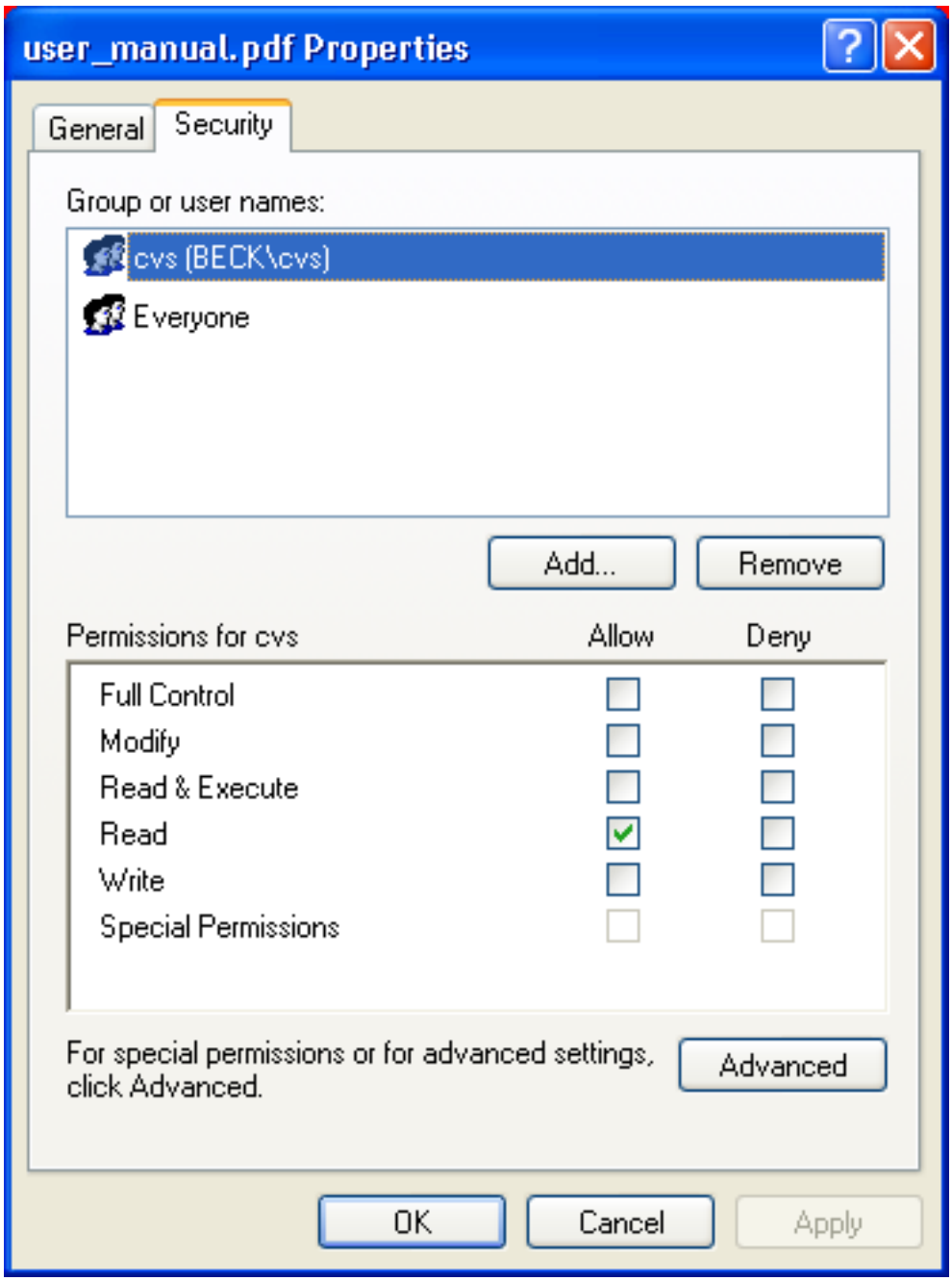


Figure 7.454. File Properties

Linux, on the other hand, has a very limited file permissions scheme, offering the basic Read (r), Write (w) and Execute (x) permissions to the file owner and his group only. Access Control Lists (ACLs) are an extension of the common Linux permission scheme. ACLs allow granting the aforementioned permissions not only to the file owner and his group, but to any number of users and groups. The need for ACLs in OpenRG is mainly to support permissions defined by a Windows client connected to the file server. This connection is done via the 'Microsoft File and Printer Sharing Protocol', which is supported on OpenRG and allows interoperability between Linux/Unix servers and Windows-based clients. The basic user and group file permissions in Windows are: Full control, Modify, Read and Execute, Read, and Write. Each permission can be allowed or denied. Linux supports Read, Write and Execute only, and does not support the Allow/Deny mechanism. When you modify a file's permissions on a Windows client, OpenRG uses a "best effort" algorithm to translate the ACLs to Linux r/w/x bits, making the file compatible with Linux clients.

7.11.2.4.1. Viewing and Modifying ACLs

This section explains how to view and modify file ACLs on a Windows client connected to OpenRG's file server. To view a file's ACLs:

1. Click the file share link in the 'File Server Shares' section (see figure Figure 7.444) of the 'File Server' screen to open the file share (login with a valid user for the share if a login prompt appears).
2. Create a file on the share.
3. Right-click the file and choose "Properties".
4. Click the Security tab to view the file ACLs (see figure Figure 7.454). If you do not have a Security tab:
    1. Open "My Computer" and choose Tools and then Folder Options.
    2. Under the View tab, uncheck the "Use simple file sharing (Recommended)" check box.

Under the Security tab you can view the permissions of the file owner, the owner's group and the group "Everyone", for all other users. If you have more users (or groups) defined on OpenRG, you can add them to the file's ACL and grant them permissions. To modify a file's ACLs:

1. Click the 'Add' button in the Security tab window to view the users and groups list.
2. In the 'Select Users or Groups' window that appears (see figure Figure 7.455), press the 'Advanced' button.

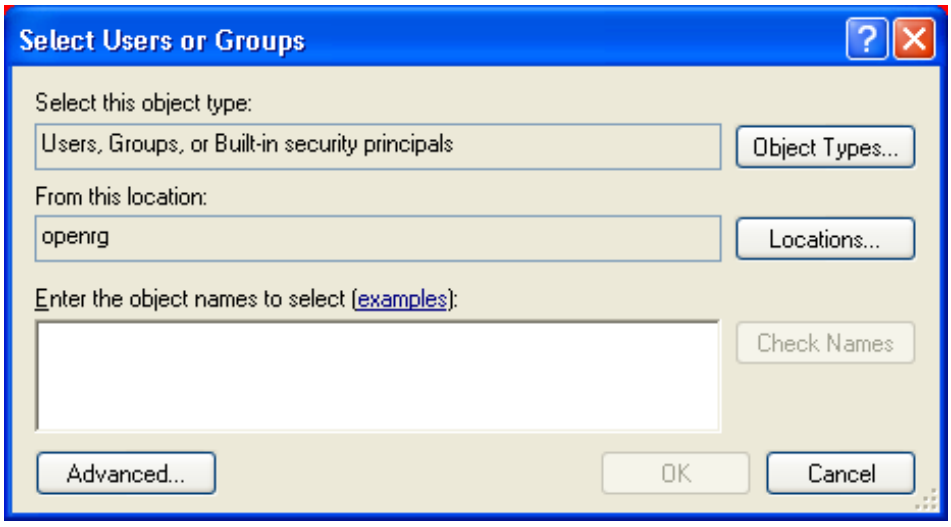


Figure 7.455. Select Users or Groups

3. In the advanced window (see figure Figure 7.456) press the 'Find Now' button.
4. A login prompt will appear. Log in with the same share user [2] . A list of both OpenRG users and system default users will be displayed (see figure Figure 7.456).

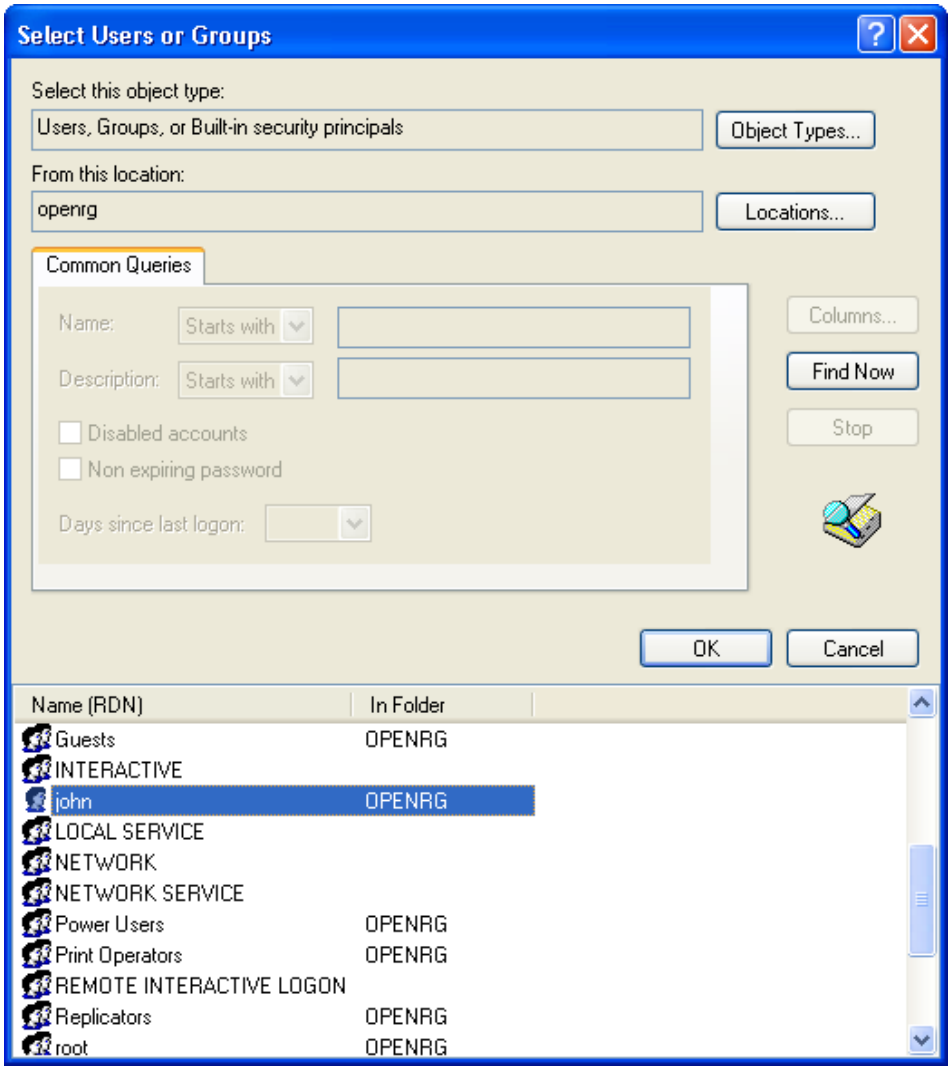


Figure 7.456. Users or Groups List

5. Select an OpenRG user from the list and click 'OK'. Click 'OK' again in the initial 'Select Users or Groups' window to save the settings. The selected user will be added to the groups and users list on the Security tab, with the default ACLs.

6. Check or uncheck the different permissions to allow or deny the user of the permissions.

7. Click 'OK' to save the settings.

In the same manner, you can remove a user or a group using the 'Remove' button in the Security window.

7.11.2.5. Using the File Server with Mac

In order to connect to OpenRG's file server with a Mac computer, perform the following:

1. On your Mac computer connected to OpenRG, click "Connect to Server" from the "Go" menu. The 'Connect to Server' screen appears.

Figure 7.457. Connect to Server

2. In the server address field, enter **smb://192.168.1.1** , and click the 'Connect' button. A new window appears, displaying the available file shares.

Figure 7.458. Connect to Server

3. Select the share to which you would like to connect. If prompted, enter a valid username and password, and click 'OK'. When a connection is established, the share content appears.

Figure 7.459. Connect to Server

7.11.3. WINS Server

OpenRG can operate as a Windows Internet Naming Service (WINS) server, handling name registration requests from WINS clients and registering their names and IP addresses. WINS is a name resolution software from Microsoft that converts NetBIOS names to IP addresses. Windows machines that are named as PCs in a workgroup rather than in a domain use NetBIOS names, which must be converted to IP addresses if the underlying

transport protocol is TCP/IP. Windows machines identify themselves to the WINS server, so that other Windows machines can query the server to find the IP address. Since the WINS server itself is contacted by IP address, which can be routed across subnets, WINS allows Windows machines on one LAN segment to locate Windows machines on other LAN segments by name. When a host connects to the LAN, it is assigned an IP address by OpenRG's DHCP (see section Section 7.13.2). The WINS database is automatically updated with its NetBIOS name and the assigned IP address. OpenRG's WINS server also responds to name queries from WINS clients by returning the IP address of the name being queried (assuming the name is registered with the WINS server). The "Internet" in the WINS name refers to the enterprise Internet (LAN), not the public Internet. To configure OpenRG's WINS server settings, perform the following:

1. Access the WINS Server settings either from its link in the 'Storage' tab under the 'Services' screen, or by clicking the 'WINS Server' icon in the 'Advanced' screen. The 'WINS Server' screen will appear (see figure Figure 7.460). By default, OpenRG's WINS server is disabled.

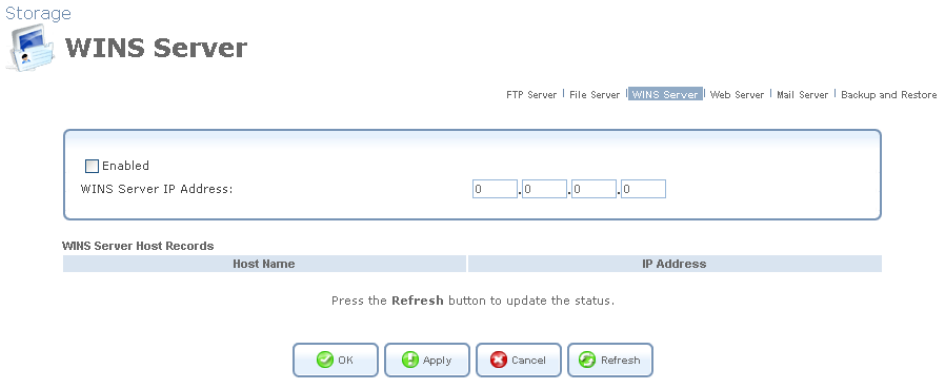


Figure 7.460. WINS Server

2. If you would like to use an external WINS server, enter its IP address and click 'OK'.

3. If you would like to use OpenRG's WINS server, select the 'Enabled' check-box. The screen will refresh, omitting the IP address field (see figure Figure 7.461).

Figure 7.461. WINS Server

4. Select the 'Domain Master Browser' check box if you would like OpenRG to act as a domain master in the Windows NetBIOS protocol.

5. Click 'OK' to save the settings.

Hosts connected to the LAN will register their names and IP addresses with either the specified remote WINS server or with OpenRG's WINS server, depending on the configuration above. In both cases, the registered hosts will be added to the 'WINS Server Host Records' table in this screen.

7.11.4. Web Server

OpenRG can operate as a Web server, hosting one or more Web sites which are accessible from the LAN or the WAN. The advantages of this feature are:

- The Web site is hosted on OpenRG, eliminating the need to assign a station on the LAN to act as a Web server, or to outsource expensive hosted services.
- LAN security: users from the internet can access your Web site without entering your LAN.
- Simple and fast configuration.

There are several preliminary actions that you must take before configuring your Web server on OpenRG:

1. Register a domain name and map it to OpenRG's WAN IP (see section Section 7.12).
2. Connect a storage device (such as a hard drive) to OpenRG and configure its file server (see section Section 7.11.2).
3. Create your Web files and upload them to a folder on the file server.

Access the Web Server settings either from its link in the 'Storage' tab under the 'Services' screen, or by clicking the 'Web Server' icon in the 'Advanced' screen. The 'Web server' screen appears:

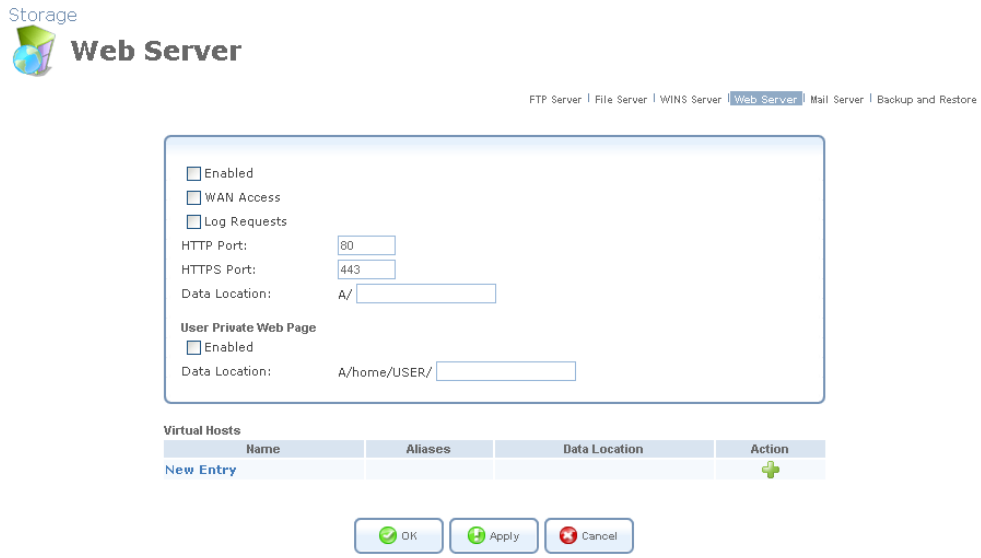


Figure 7.462. Web Server

Enabled Check or un-check this box to enable or disable this feature.

WAN Access Check this box to allow access to your Web server over the Internet.

Log Requests Check this box to log connection requests made to your Web server.

HTTP Port The port your Web server uses for HTTP traffic.

HTTPS Port The port your Web server uses for HTTPS traffic.
The following sections describe how to configure OpenRG's Web server capabilities, including hosting user-private Web pages and multiple independent Web sites.

7.11.4.1. Setting Up Your Web Site on OpenRG

1. In the Web server screen, type the file system path of the OpenRG folder containing your Web site content in the 'Data Location' field:

Figure 7.463. Data Location Field

2. Click 'OK' to save the settings.

7.11.4.2. Hosting User Private Web Pages

Each user on the LAN can configure a private Web page, which can be reached by browsing to { http:// openrg.home/~<username>}. This path will be mapped to a sub directory of the users' home directory on OpenRG. To set a private Web page:

1. In the Web server screen, check the 'Enabled' check box in the 'User Private Web Page' section.

2. Type the user's sub directory containing the Web page content in the 'Data Location' field.

Figure 7.464. User Private Web Page

3. Click 'OK' to save the settings.

7.11.4.3. Setting Up Virtual Hosts on OpenRG

You can configure any number of additional Web sites on the OpenRG Web server. Each of these sites will appear to the Internet user to be on a separate host. This method is referred to as Virtual Hosts. In addition, you can add any number of aliases to each virtual host. Browsers from within the LAN will reach your Web sites directly. However, you will have to register domain names in order to provide external access to your sites. These domain names must be mapped to OpenRG's WAN IP address by the DNS. To configure additional Web sites:

Figure 7.467. New Virtual Host

1. In the 'Web server' screen, click the 'New Entry' link in the 'Virtual Hosts' section (see figure Figure 7.462). The 'Virtual Host' screen appears:

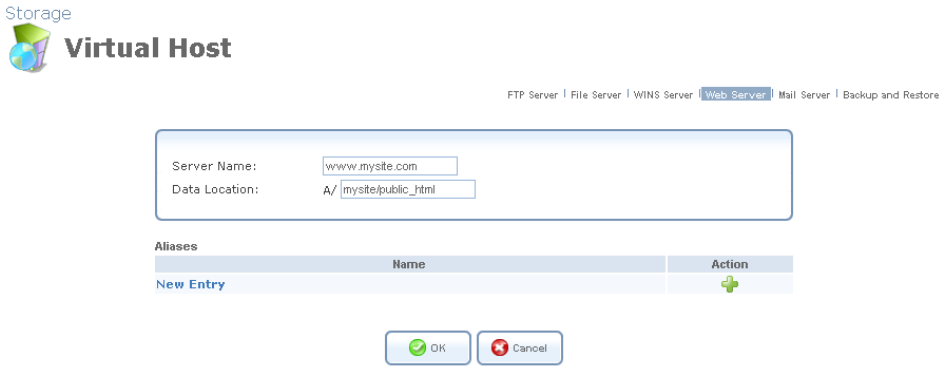


Figure 7.465. Virtual Host

2. Type the Web site's domain name in the 'Server Name' field.
3. Type the file system path of the OpenRG folder containing the Web site content in the 'Data Location' field.
4. To add an alias to the virtual host, click the 'New Entry' link in the 'Aliases' section. The 'Virtual Host Aliases' screen appears:

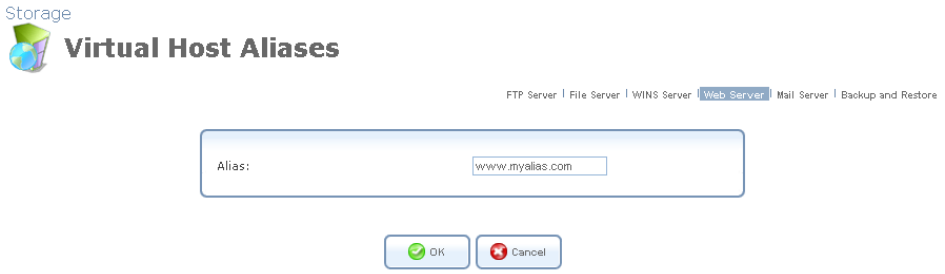


Figure 7.466. Virtual Host Aliases

5. Type an alias URL in the 'Alias' field, and click 'OK'. The new alias appears under the 'Aliases' section (see figure Figure 7.465).
6. Click 'OK' to save the settings.
7. Click 'OK' to save the settings.

7.11.5. Mail Server

OpenRG can operate as a mail server, serving both users on the LAN and the WAN. Users can access their mailboxes both as a home-based service, when working within the network, or as a web-based service, when working remotely.

Note: In order for this feature to operate properly, a system storage area must be created on OpenRG's storage device. For more information, refer to Section 6.4.2.

7.11.5.1. Mail Server Configuration

Before configuring your mail server, you must register a domain name and map its A field (default server) or MX field (mail server) to OpenRG's WAN IP address. This can easily be done using the Dynamic DNS feature (see section Section 7.12). To configure your mail server:

1. Access the Mail Server settings either from its link in the 'Storage' tab under the 'Services' screen, or by clicking the 'Mail Server' icon in the 'Advanced' screen. The 'Mail Server' screen appears.

Figure 7.468. Mail Server

2. Enable the mail server by checking the 'Enabled' check box. The full mail server screen appears.

Figure 7.469. Enabled Mail Server

3. Enter the registered domain name in the 'Domain' field.

4. Choose the default Inbox quota for each new mailbox in the 'Quota' section.

5. Choose the maximum number of simultaneous connections allowed to the mail server. It is recommended that this value be left at the default of three.

6. Check the Sender Policy Framework (SPF) check box to allow mail filtering (recommended).

7. Check the 'Log Messages' check box to log the senders and receivers of all the sent, received and rejected messages in the system log. It is recommended that this option remains unchecked.

8. The next three sections should be configured according to your required mail retrieval protocols. You can enable POP3, IMAP4 and IMAPS, and choose whether to allow each with WAN access, by checking the relevant check boxes.

9. Click 'OK' to save the settings.

7.11.5.2. Mailbox Configuration

To configure a mailbox:

1. Click the 'Users' icon in the 'Advanced' screen of the WBM. The 'Users' screen appears:

Figure 7.470. Users

2. Click the action icon of the user for which you would like to create a mailbox. The 'User Settings' screen appears:

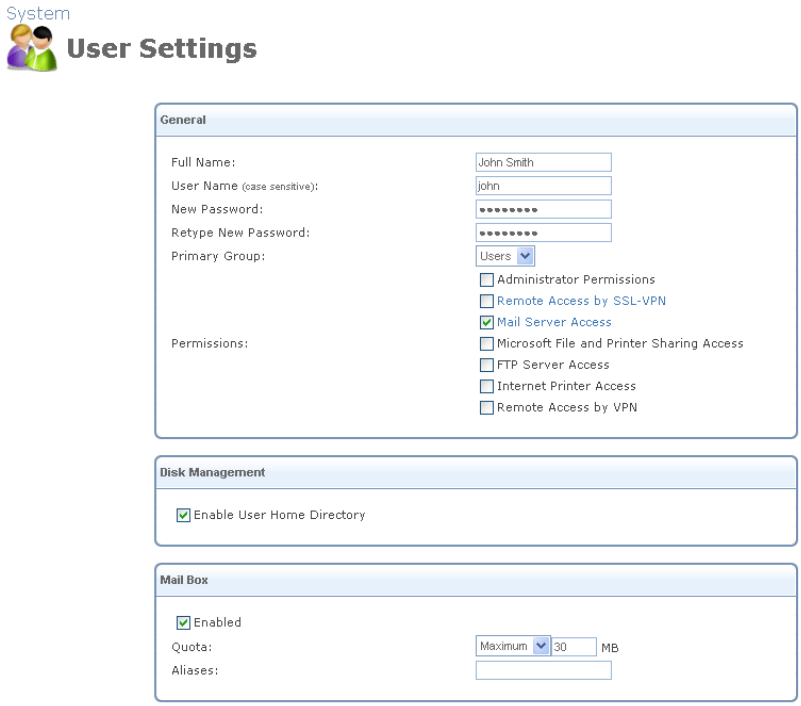


Figure 7.471. User Settings

3. In this screen, perform the following:

    1. Check the 'Enable User Home Directory' check box. This feature creates a home directory for the user.

2. In the Permissions section, check the 'Mail Server Access' check box, to grant this permission.

3. Enable the mailbox by checking the 'Enabled' check box in the 'Mail Box' section.

4. Click 'OK' to save the settings.

The user's email address will be <username>@<domain name> where <username> is the OpenRG username of the user, and <domain name> is the domain name configured for the mail server.

7.11.5.3. Additional Features

7.11.5.3.1. Email Aliases

You may add any number of aliases to an email address. Emails sent to an alias address will be rerouted to the main address. To configure email aliases:

1. Click the 'Users' icon in the 'Advanced' screen of the WBM. The 'Users' screen appears.

2. Click the action icon of the user for which you would like to add aliases.

3. In the 'User Settings' screen that appears (see figure Figure 7.472), enter the aliases (usernames only) as a comma-separated list in the 'Aliases' field of the 'Mail Box' section.

Figure 7.472. Mail Box Aliases

4. Click 'OK' to save the settings.

7.11.5.3.2. Mailing Lists

You may configure mailing lists to easily send mass emails. To configure mailing lists: Figure 7.475

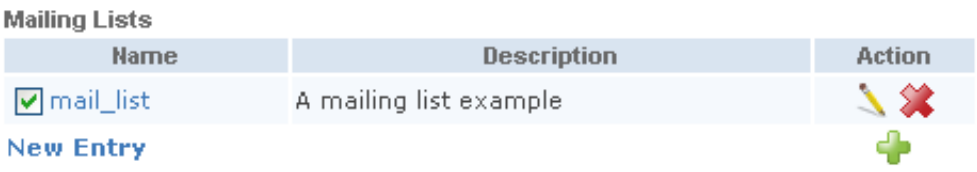


Figure 7.475. New Mailing List

1. Click the 'Mail Server' icon in the 'Advanced' screen of the WBM. The 'Mail Server' screen appears (see figure Figure 7.469).

2. Click the 'Mailing Lists' tab. The 'Mailing Lists' screen appears.

Figure 7.473. Mailing Lists

3. Click the 'New Entry' link to add a new mailing list. The 'Mailing Lists' screen appears.

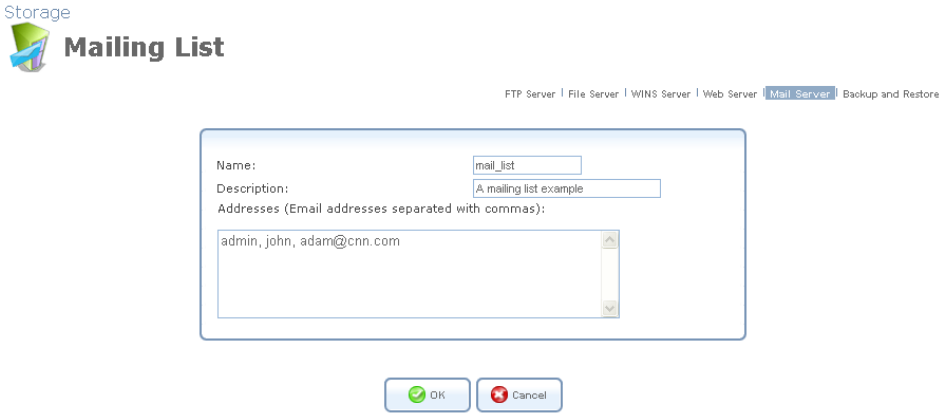


Figure 7.474. Mailing Lists

4. Enter a name and description for the mailing list in their respective fields. In the 'Addresses' field, enter a comma-separated list of the email addresses that you would like to include in the mailing list. Adding local addresses requires entering the usernames only, while adding external addresses requires entering the full email addresses.

5. Click 'OK' to save the settings.

7.11.5.4. Email Client Configuration

OpenRG email clients can access their mailboxes both from within the LAN and remotely over the internet.

7.11.5.4.1. LAN Email Clients

LAN email clients should configure the following:

- The incoming and outgoing mail servers should be configured with OpenRG's LAN IP (192.168.1.1) or LAN domain name (openrg.home).
- The outgoing mail server (SMTP) does not require authentication from the LAN.
- The incoming mail server (POP3, IMAP4 or IMAPS) requires authentication of the user's username and password.

7.11.5.4.2. WAN Email Clients

WAN email clients should configure the following:

- The incoming and outgoing mail servers should be configured with OpenRG's WAN IP or WAN domain name.
- The outgoing mail server requires authentication of the user's username and password.
- The incoming mail server (POP3, IMAP4 or IMAPS) must be enabled for OpenRG's WAN, and requires authentication of the user's username and password.

7.11.6. Backup and Restore

OpenRG's backup facility allows backing up data, stored in the system storage area, to external USB disks. You may specify backups to run automatically at scheduled times. Two preliminary conditions must be met before enabling the backup mechanism:

- The file server feature must be activated and configured (see section Section 7.11.2).
- The file server must be consisted of at least two disks.

Please note that the the backup is done at the directory level, meaning that it is not possible to backup a single stand-alone file.

7.11.6.1. Backing Up Your Data

To backup your data:

1. Access the Backup settings either from its link in the 'Advanced' tab under the 'Services' screen, or by clicking the 'Backup and Restore' icon in the 'Advanced' screen. The 'Backup and Restore' screen appears:

Figure 7.476. Backup and Restore

2. Click the 'New Entry' link in the 'Backup Schedule' section.
3. In the 'Edit Backup' screen that appears (see figure Figure 7.477), configure the following parameters:
    1. Type the source to backup. For example, { A/homes}.
    2. Type the destination of the backup files. For example, { B/backups}. It is recommended that the destination be an external storage device.
    3. Choose between full backup, incremental backup, or both, by scheduling a time for the backup operation. You can choose between daily, weekly or monthly backups in the 'Schedule' combo boxes.
4. Press 'OK' to save the schedule settings.

5. Press 'Backup Now' to run the backup operation immediately. When backing up, the screen will display the status and progress of the operation.

Note: Do not schedule a monthly backup on the 31st, as backups will not run on months with 30 days.

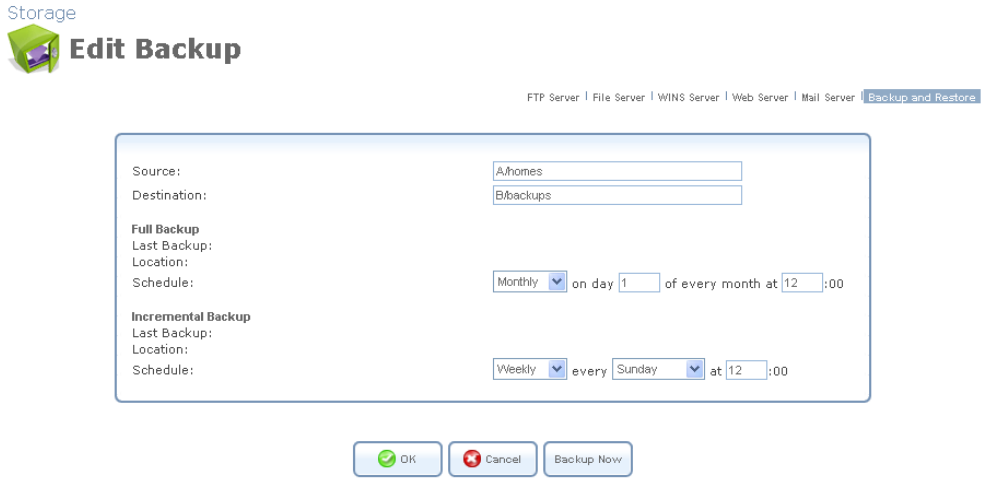


Figure 7.477. Edit Backup

7.11.6.2. Restoring Your Data

To restore your data:

1. Press the 'Backup and Restore' icon in the 'Advanced' screen of the WBM. The 'Backup and Restore' screen appears (see figure Figure 7.476).

2. Press the 'Restore' tab.

3. In the 'Restore' screen that appears (see figure Figure 7.478), configure the following parameters:

    1. Type the source to restore in the 'Source Archive' field. For example, { A/homes}.

    2. Choose whether to restore the entire archive or only a sub directory, in the 'Restore Option' combo box. If you choose sub directory, a second field appears in which you must enter the name of the sub directory, relative to the source archive. For example, to restore { A/homes/john}, type { john} as the sub directory.

    3. Choose a destination for which to restore the archive. You can choose between the original location or any other directory. If you choose the another directory, a second field appears in which you must enter the name of the directory. Note that the path of the restored directory will be created under the path of the destination directory. For example, if you specify the directory { A/restore_dir}, the result will be { A/restore_dir/A/homes/john}.

Figure 7.478. Edit Restore

7.12. Personal Domain Name (Dynamic DNS)

The Dynamic DNS (DDNS) service enables you to alias a dynamic IP address to a static hostname, allowing your computer to be more easily accessible from various locations on the Internet. Typically, when you connect to the Internet, your service provider assigns an unused IP address from a pool of IP addresses, and this address is used only for the duration of a specific connection. Dynamically assigning addresses extends the usable pool of available IP addresses, whilst maintaining a constant domain name. When using the DDNS service, each time the IP address provided by your ISP changes, the DNS database will change accordingly to reflect the change. In this way, even though your IP address will change often, your domain name will remain constant and accessible.

7.12.1. Opening a Dynamic DNS Account

In order to use the DDNS feature, you must first obtain a DDNS account. For example, you can open a free account at http://www.dyndns.com/account/create.html . When applying for an account, you will need to specify a user name and password. Please have them readily available when customizing OpenRG's DDNS support.

7.12.2. Using Dynamic DNS

Use the DDNS feature to define different static host names for each of your WAN connections. Moreover, you can define more than one static host name for each WAN connection, by simply repeating the following procedure for the same connection.

1. Access this feature either from the 'Advanced' tab under the 'Services' screen, or by clicking its icon in the 'Advanced' screen. The 'Dynamic DNS' connections screen appears (see figure Figure 7.479). This screen displays a table that will present the different connections and their DDNS aliases.

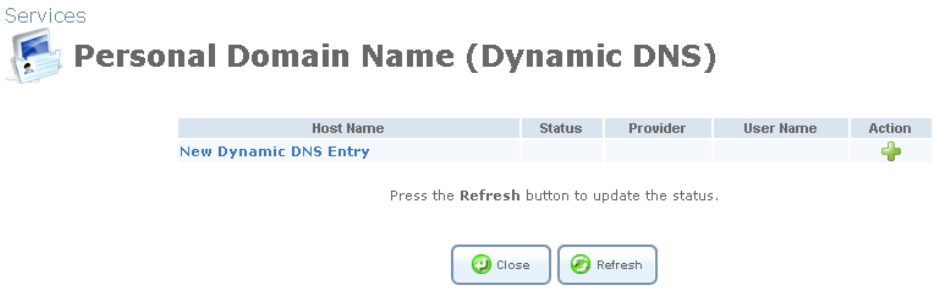


Figure 7.479. Dynamic DNS

2. Click the 'New Dynamic DNS Entry' link to add a new DDNS entry. The 'Dynamic DNS' screen appears:

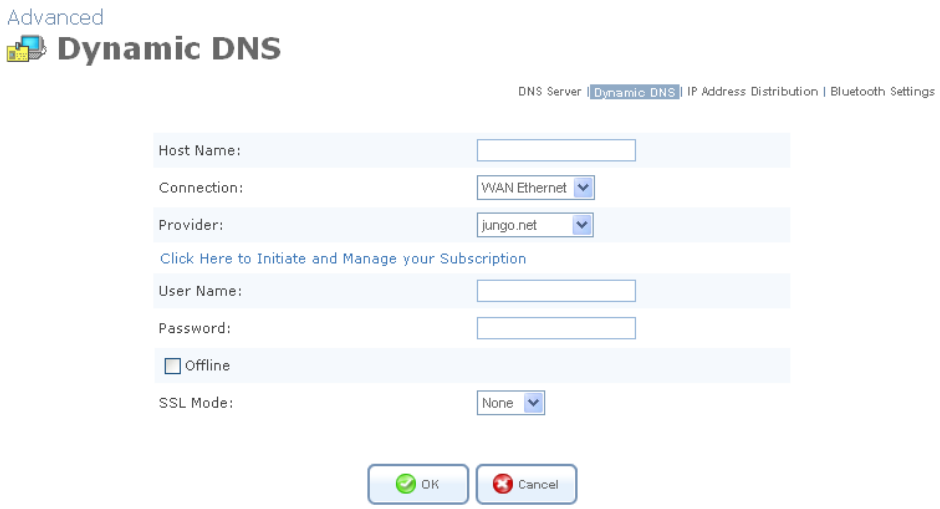


Figure 7.480. Dynamic DNS

3. Specify the DDNS parameters:
Host Name Enter your full DDNS domain name.

Connection Select the connection to which you would like to couple the DDNS service. The DDNS service will only use the chosen device, unless *failover* is enabled. In this case, the failed-to device will be used instead (assuming its route rules consent), until the chosen device is up again. For more information on failover, please refer to section Section 8.6.1.3.3.

Provider Select your DDNS service provider. The screen will refresh, displaying the parameters required by each provider. The provider depicted herein is **dyndns**, which includes all available parameters.

Click Here to Initiate and Manage your Subscription Clicking this link will open the selected provider's account creation Web page. For example, when `dyndns.org` is selected, the following page will open: http://www.dyndns.com/account/.

User Name Enter your DDNS user name.

Password Enter your DDNS password.

Wildcard Select this check-box to enable use of special links such as `http://www.<your host>.dyndns.com`.

Mail Exchanger Enter your mail exchange server address, to redirect all e-mails arriving at your DDNS address to your mail server.

Backup MX Select this check-box to designate the mail exchange server to be a backup server.

Offline If you wish to temporarily take your site offline (prevent traffic from reaching your DDNS domain name), check this box to enable redirection of DNS requests to an alternative URL, predefined in your DDNS account. The availability of this feature depends on your account's level and type of service.

SSL Mode With OpenRG versions that support Secure Socket Layer (SSL), secured DDNS services are accessed using HTTPS. Upon connection, OpenRG validates the DDNS server's certificate. Use this entry to choose the certificate's validation method.

None Do not validate the server's certificate.

Chain Validate the entire certificate chain. When selecting this option, the screen will refresh (see figure Figure 7.481), displaying an additional combo box for selecting whether to validate the certificate's expiration

time. Choose 'Ignore' or 'Check' respectively. If the certificate has expired, the connection will terminate immediately.

Figure 7.481. SSL Mode

Direct Insure that the server's certificate is directly signed by the root certificate. This option also provides the 'Validate Time' combo box for validation of the certificate's expiration time, as described above.

7.13. Advanced

7.13.1. DNS Server

Domain Name System (DNS) provides a service that translates domain names into IP addresses and vice versa. The gateway's DNS server is an auto-learning DNS, which means that when a new computer is connected to the network the DNS server learns its name and automatically adds it to the DNS table. Other network users may immediately communicate with this computer using either its name or its IP address. In addition your gateway's DNS:

- Shares a common database of domain names and IP addresses with the DHCP server.
- Supports multiple subnets within the LAN simultaneously.
- Automatically appends a domain name to unqualified names.
- Allows new domain names to be added to the database using OpenRG's WBM.
- Permits a computer to have multiple host names.
- Permits a host name to have multiple IPs (needed if a host has multiple network cards).

The DNS server does not require configuration. However, you may wish to view the list of computers known by the DNS, edit the host name or IP address of a computer on the list, or manually add a new computer to the list.

7.13.1.1. Viewing and Modifying the DNS Table

- To view the list of computers stored in the DNS table:

  1. Access this feature either from the 'Advanced' tab under the 'Services' screen, or by clicking its icon in the 'Advanced' screen. The DNS table will be displayed (see figure Figure 7.482).

Figure 7.482. DNS Table

- To add a new entry to the list:

  1. Click the 'New DNS Entry' button. The 'DNS Entry' screen will appear (see figure Figure 7.483).

  2. Enter the computer's host name and IP address.

  3. Click 'OK' to save the settings.

Figure 7.483. Add or Edit a DNS Entry

- To edit the host name or IP address of an entry:

  1. Click the 'Edit' button that appears in the Action column. The 'DNS Entry' screen appears (see figure Figure 7.483).

  2. If the host was manually added to the DNS Table then you may modify its host name and/or IP address, otherwise you may only modify its host name.

  3. Click 'OK' to save the settings.

- To remove a host from the DNS table:

  1. Click the 'Delete' button that appears in the Action column. The entry will be removed from the table.

7.13.2. IP Address Distribution

Your gateway's Dynamic Host Configuration Protocol (DHCP) server makes it possible to easily add computers that are configured as DHCP clients to the home network. It provides a mechanism for allocating IP addresses and delivering network configuration parameters to such hosts. OpenRG's default DHCP server is the LAN bridge.
A client (host) sends out a broadcast message on the LAN requesting an IP address for itself. The DHCP server then checks its list of available addresses and leases a local IP address to the host for a specific period of time and simultaneously designates this IP address as `taken'. At this point the host is configured with an IP address for the duration of the lease. The host can choose to renew an expiring lease or let it expire. If it chooses to renew a lease then it will also receive current information about network services, as it did with the original lease, allowing it to update its network configurations to reflect any changes that may have occurred since it first connected to the network. If the host wishes to terminate a lease before its expiration it can send a release message to the DHCP server, which will then make the IP address available for use by others.
Your gateway's DHCP server:

- Displays a list of all DHCP host devices connected to OpenRG
- Defines the range of IP addresses that can be allocated in the LAN
- Defines the length of time for which dynamic IP addresses are allocated
- Provides the above configurations for each LAN device and can be configured and enabled/disabled separately for each LAN device

- Can assign a static lease to a LAN PC so that it receives the same IP address each time it connects to the network, even if this IP address is within the range of addresses that the DHCP server may assign to other computers
- Provides the DNS server with the host name and IP address of each PC that is connected to the LAN

Additionally, OpenRG can act as a DHCP relay, escalating DHCP responsibilities to a WAN DHCP server. In this case, OpenRG will act merely as a router, while its LAN hosts will receive their IP addresses from a DHCP server on the WAN. With OpenRG's optional Zero Configuration Technology feature, the IP Auto Detection method detects statically-defined IP addresses in addition to OpenRG's DHCP clients. It learns all the IP addresses on the LAN, and integrates the collected information with the database of the DHCP server. This allows the DHCP server to issue valid leases, thus avoiding conflicting IP addresses used by other computers in the network. For more information regarding this option, please refer to chapter Chapter 10 .

7.13.2.1. DHCP Server Settings

To view a summary of the services currently being provided by the DHCP server, either use its link in the 'Advanced' tab under the 'Services' screen, or click the 'IP Address Distribution' icon in the 'Advanced' screen. The 'IP Address Distribution' screen appears:

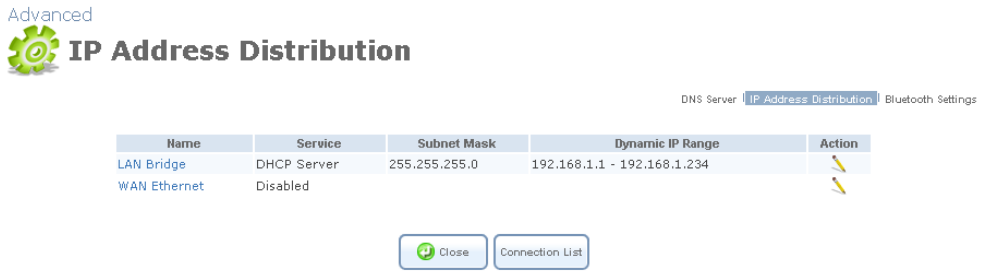


Figure 7.484. IP Address Distribution

Note: If a device is listed as 'Disabled' in the 'Service' column, then DHCP services are not being provided to hosts connected to the network through that device. This means that the gateway will not assign IP addresses to these computers, which is useful if you wish to work with static IP addresses only.

To edit the DHCP server settings for a device:

1. Click the device's action icon . The DHCP settings for this device appears:

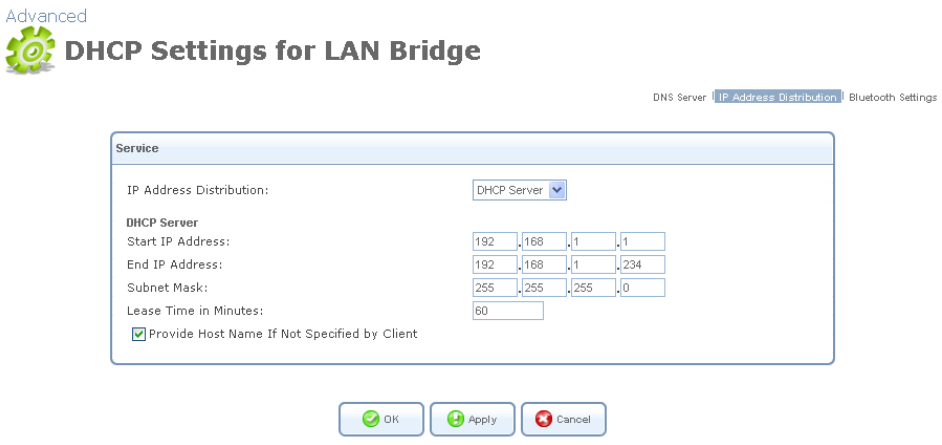


Figure 7.485. DHCP Settings for LAN Bridge

2. Select the DHCP service:
   Disabled Disable the DHCP server for this device.

   DHCP Server Enable the DHCP server for this device.

   DHCP Relay Set this device to act as a DHCP relay (see section Section 7.13.2.2).

3. Assuming you have chosen DHCP Server, complete the following fields:

1. **Start IP Address** The first IP address that may be assigned to a LAN host. Since the gateway's default IP address is 192.168.1.1, this address must be 192.168.1.2 or greater.

   End IP Address The last IP address in the range that can be used to automatically assign IP addresses to LAN hosts.

   Subnet Mask A mask used to determine to what subnet an IP address belongs. An example of a subnet mask value is 255.255.0.0.

   Lease Time In Minutes Each device will be assigned an IP address by the DHCP server for a this amount of time, when it connects to the network. When the lease expires the server will determine if the computer has disconnected from the network. If it has, the server may reassign this IP address to a newly-connected computer. This feature ensures that IP addresses that are not in use will become available for other computers on the network.

   Provide Host Name If Not Specified by Client If the DHCP client does not have a host name, the gateway will automatically assign one for him.

2. Click 'OK' to save the settings.

7.13.2.2. DHCP Relay Settings

To configure a device as a DHCP relay, perform the following steps:

1. Select the 'DHCP Relay' option in the 'IP Address Distribution' combo-box under the Service section (see figure Figure 7.485). The screen will refresh (see figure Figure 7.486).

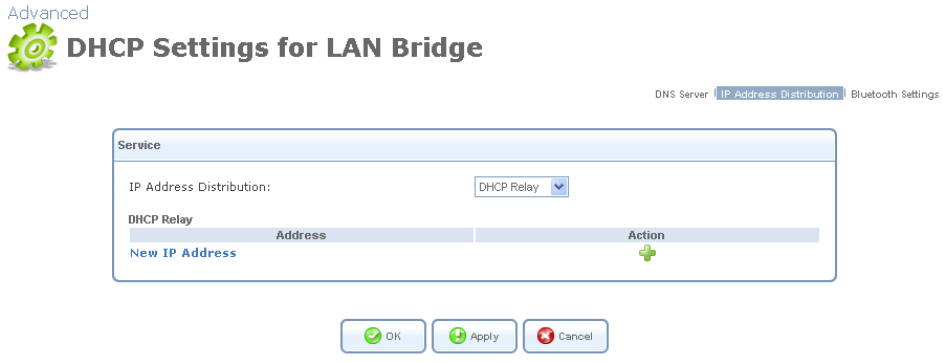


Figure 7.486. DHCP Settings for LAN Bridge

2. Click the 'New IP Address' link. The 'DHCP Relay Server Address' screen appears:

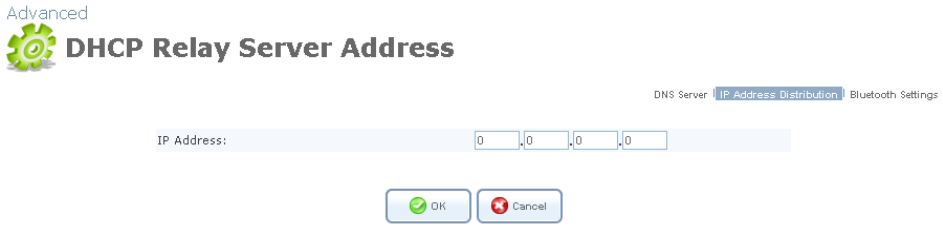


Figure 7.487. DHCP Relay Server Address

3. Specify the IP address of the DHCP server.
4. Click 'OK' to save the settings.
5. Click 'OK' once more in the 'DHCP Settings' screen.
6. Click the 'Network Connections' tab in the 'System' screen. The 'Network Connections' screen appears (see figure Figure 8.10).
7. Click the 'WAN Ethernet' link. The 'WAN Ethernet Properties' screen appears (see figure Figure 8.115).
8. In the 'Routing' section, select 'Advanced' from the combo-box. The screen will refresh (see figure Figure 7.488).

Figure 7.488. Configure WAN Ethernet -- Routing

9. In the 'Routing Mode' combo-box, select "Route". This will change OpenRG's WAN to work in routing mode, which is necessary in order for DHCP relaying to function properly.
10. Click 'OK' to save the settings.

7.13.2.3. DHCP Connections

To view a list of computers currently recognized by the DHCP server, press the 'Connection List' button that appears at the bottom of the 'IP Address Distribution' screen (see figure Figure 7.484). The 'DHCP Connections' screen appears:

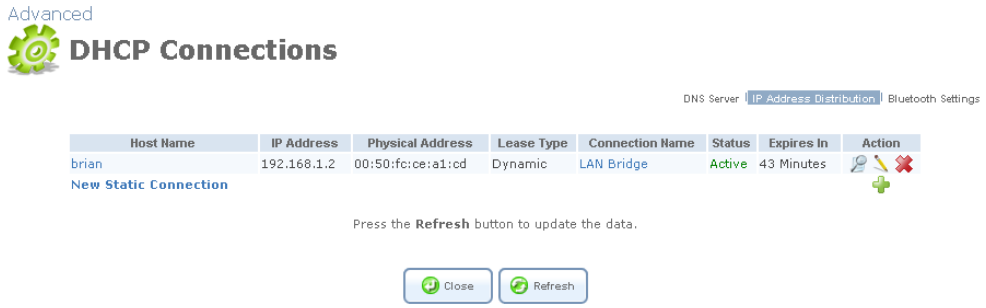


Figure 7.489. DHCP Connections

To define a new connection with a fixed IP address:

1. Click the 'New Static Connection' link. The 'DHCP Connection Settings' screen appears:

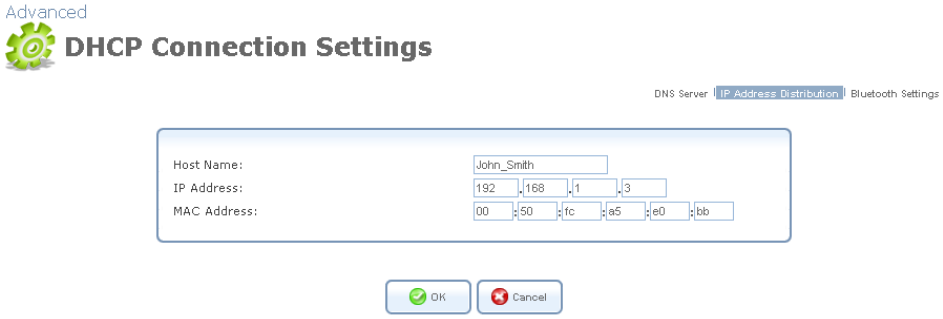


Figure 7.490. DHCP Connection Settings

2. Enter a host name for this connection.
3. Enter the fixed IP address that you would like to have assigned to the computer.
4. Enter the MAC address of the computer's network card.

> Note: A device's fixed IP address is actually assigned to the specific network card's (NIC) MAC address installed on the LAN computer. If you replace this network card then you must update the device's entry in the DHCP Connections list with the new network card's MAC address.

5. Click 'OK' to save the settings.

The 'DHCP Connections' screen will reappear (see figure Figure 7.491), displaying the defined static connection. This connection can be edited or deleted using the standard action icons.

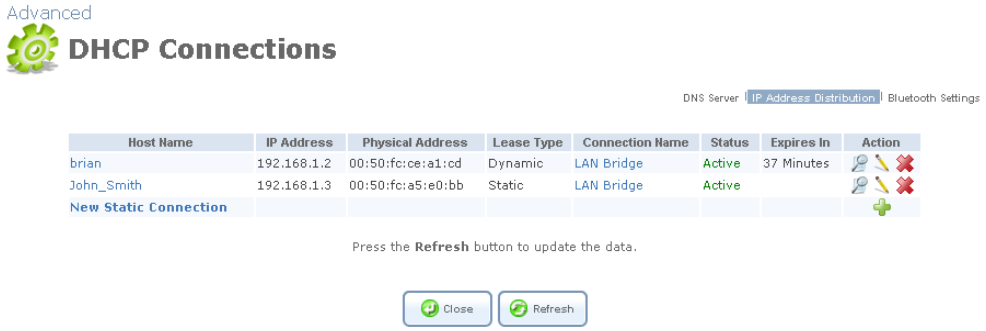


Figure 7.491. DHCP Connections

7.13.3. Bluetooth Settings

Yet another method to connect to OpenRG's LAN is by Bluetooth, an open specification for wireless, short-range transmission between PCs, mobile phones and other portable devices. When connected to OpenRG via Bluetooth, users can benefit from standard network connectivity, limited only by the capabilities of their connected devices. OpenRG utilizes the Bluetooth Network Encapsulation Protocol (BNEP), used by the Bluetooth Personal Area Network (PAN) profile. This layer encapsulates packets from various networking protocols, which are transported directly over the Logical Link Control and Adaptation Protocol (L2CAP) layer.

Hardware Note: Platforms that do not feature an integrated Bluetooth chip, require a Linux-supported Bluetooth dongle, which can be connected to the gateway either by USB or PCI.

As soon as a Bluetooth dongle is connected, OpenRG can be found and connected to by Bluetooth devices. To configure OpenRG's Bluetooth settings, perform the following steps:

1. Access the Bluetooth settings either from its link in the 'Advanced' tab under the 'Services' screen, or by clicking the 'Bluetooth Settings' icon in the 'Advanced' screen. The 'Bluetooth Settings' screen appears. Select the 'Enabled' check box to enable this feature.

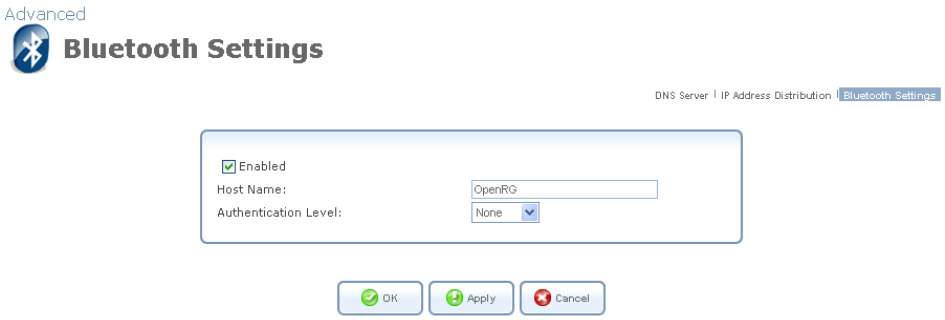


Figure 7.492. Bluetooth Settings

Enabled Select this check-box to enable Bluetooth connections to OpenRG.

Host Name OpenRG's identification name in the PAN. You can change the default to any string.

Authentication Level Select the level of authentication to be performed upon a connection request:

None Connect without authentication.

Enabled Enable authentication using a pin number, which will have to be provided by the device wishing to connect.

Encrypt Enable and encrypt the authentication method.

PIN Enter a value for the authentication/encryption key if you selected the 'Enabled' or 'Encrypted' options above.

2. Click 'OK' to save the settings.

The new Bluetooth connection will be added to the network connections list under the LAN bridge, and will be configurable like any other connection.

7.13.4. RADIUS Server

A Remote Authentication Dial-in User Service (RADIUS) server is most commonly a "third party" server, used for authentication of wireless clients who wish to connect to an access point. The wireless client contacts an access

point (a RADIUS client), which in turn communicates with the RADIUS server. The RADIUS server performs the authentication by verifying the client's credentials, to determine whether the device is authorized to connect to the access point's LAN. If the RADIUS server accepts the client, it responds by exchanging data with the access point, including security keys for subsequent encrypted sessions. OpenRG can act both as a RADIUS client and a server, and can be used for the authentication of any clients---wireless or wired.
This enables a scenario of multiple gateways acting as RADIUS clients, connected to a "master" gateway that acts as a RADIUS server. Such a scenario can be useful in an enterprise consisting of multiple divisions.

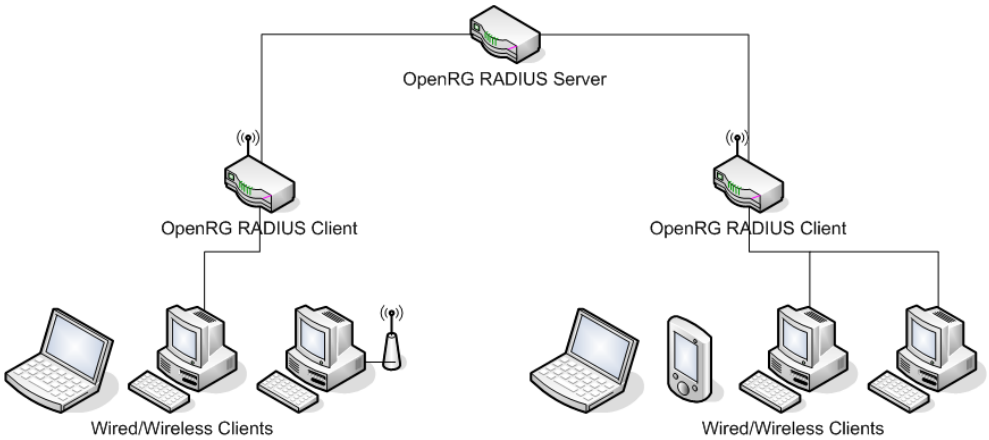


Figure 7.493. RADIUS Server Scenario

7.13.4.1. RADIUS Server Configuration

OpenRG as a RADIUS client is described in the LAN Wireless section of this manual (section Section 8.4.6). To configure OpenRG as a RADIUS server, perform the following:

1. Access the RADIUS Server settings either from the link in the 'Advanced' tab under the 'Services' screen, or by clicking the 'RADIUS Server' icon in the 'Advanced' screen. The 'RADIUS Server' screen appears.

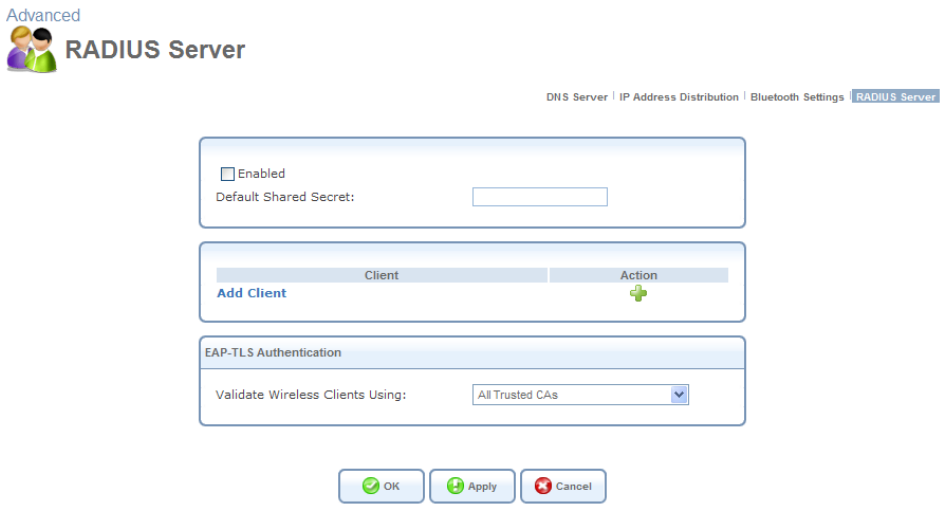


Figure 7.494. RADIUS Server

2. Check the 'Enabled' check box to enable this feature.

3. If you would like to set a shared secret that any RADIUS client can provide when requesting authentication, specify a 'Default Shared Secret'.

4. You can also set specific shared secrets for known clients by clicking 'Add Client'. The 'Add RADIUS Client' screen appears.

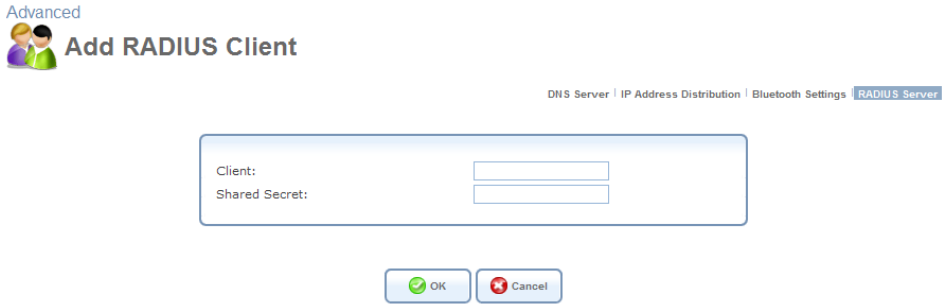


Figure 7.495. Add RADIUS Client

5. Enter the client's IP address and a shared secret value, and click 'OK'. You are routed back to the 'RADIUS Server' screen, which now displays the newly added client.

Figure 7.496. Newly Added Client

7.13.4.2. RADIUS Authentication Algorithms

OpenRG's RADIUS server utility uses six different authentication algorithms. These are:

- PAP
- CHAP
- MSCHAP
- MSCHAP v2
- EAP PEAP MSCHAP v2
- EAP TLS

While the first four use only username and password combinations for authentication, the EAP-PEAP algorithm utilizes the server's certificate for authentication, and EAP TLS authenticates both the client and server with certificates (for more information about certificates, refer to section Section 8.9.4). When a request is received from a client, a negotiation begins in which certificates are passed between the client and server, resolving in either acceptance or rejection. In the 'EAP-TLS Authentication' section of the 'RADIUS Server' screen, you can select the certificate by which to validate wireless clients. Select "All Trusted CAs" to validate a client with any of OpenRG's trusted certificates, or choose a specific certificate from the list.

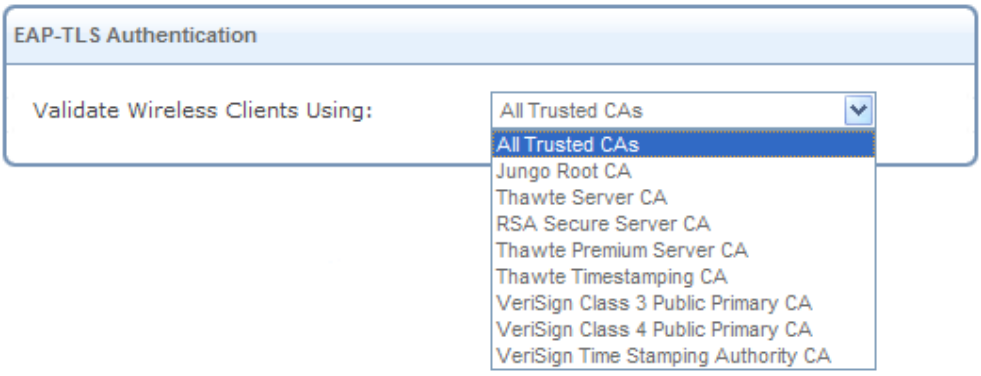


Figure 7.497. EAP-TLS Authentication

7.13.4.3. Connecting Windows Clients with RADIUS Authentication

This section describes the methods for connecting a wireless Windows client to a RADIUS client gateway, served by a RADIUS server gateway. There are two methods; one uses the EAP PEAP MSCHAP v2 authentication algorithm and the other uses the EAP TLS algorithm. The following must be configured:

- An OpenRG gateway serving as a RADIUS server
- An OpenRG gateway serving as a RADIUS client
- A Windows computer serving as a wireless client

Configure the OpenRG RADIUS server as described earlier (refer to section Section 7.13.4.1 [380]). Next, configure the OpenRG RADIUS client as follows:

1. Access the LAN Wireless network connection settings from the 'Network Connections' link in the 'System' screen, and select the 'Wireless' tab.

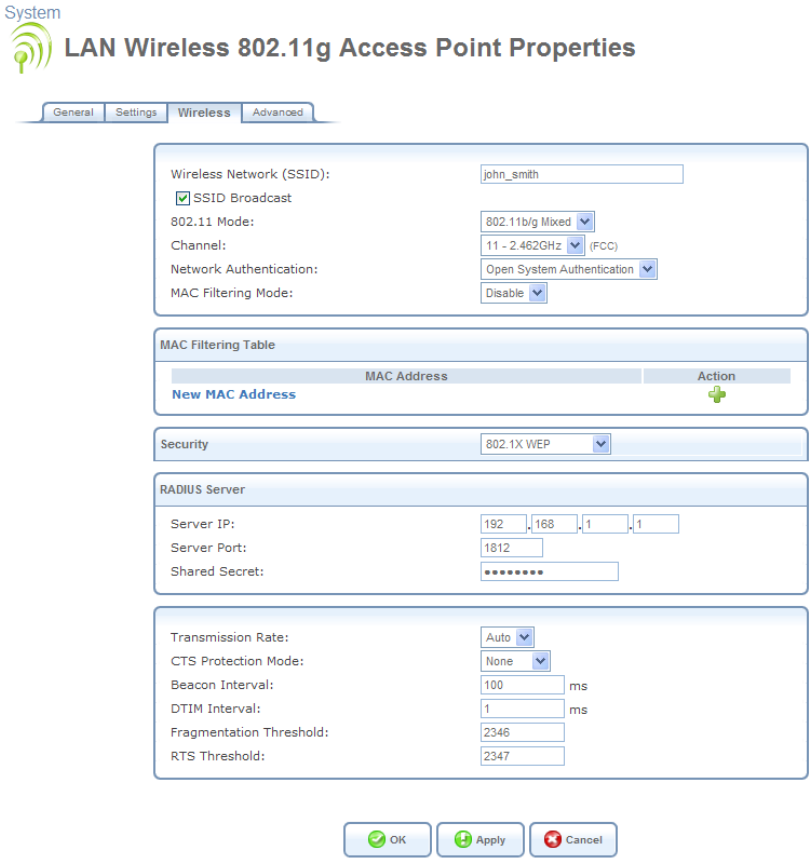


Figure 7.498. LAN Wireless Settings

You may change your wireless network's name (SSID) from the default "openrg" to something more personal (in this example, "john_smith").

2. In the 'Security' section, select either 802.1X WEP or WPA. If you selected WPA, select 802.1X as the authentication method.

3. In the 'RADIUS Server' section, enter the IP address and shared secret of the gateway serving as a RADIUS server (192.168.1.1), in their respective fields.

4. Click 'OK' to save the settings.

The configuration of the wireless client differs a little between the two algorithms. Start the configuration by performing the following:

1. Access the Windows 'Network Connections' utility and double-click the wireless network connection icon. The 'Wireless Network Connection' window displays the wireless networks in range.

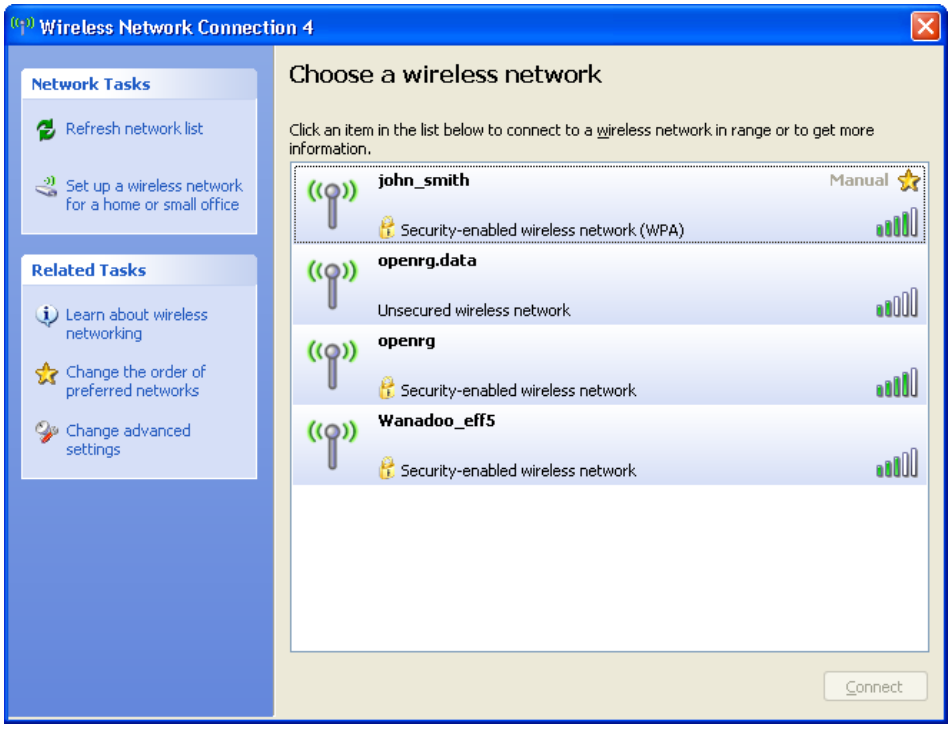


Figure 7.499. Wireless Network Connection Window

2. Click your wireless network entry and then click the 'Change advanced settings' link at the bottom of the sidebar. The 'Wireless Network Connection Properties' window appears. Click its 'Wireless Networks' tab.

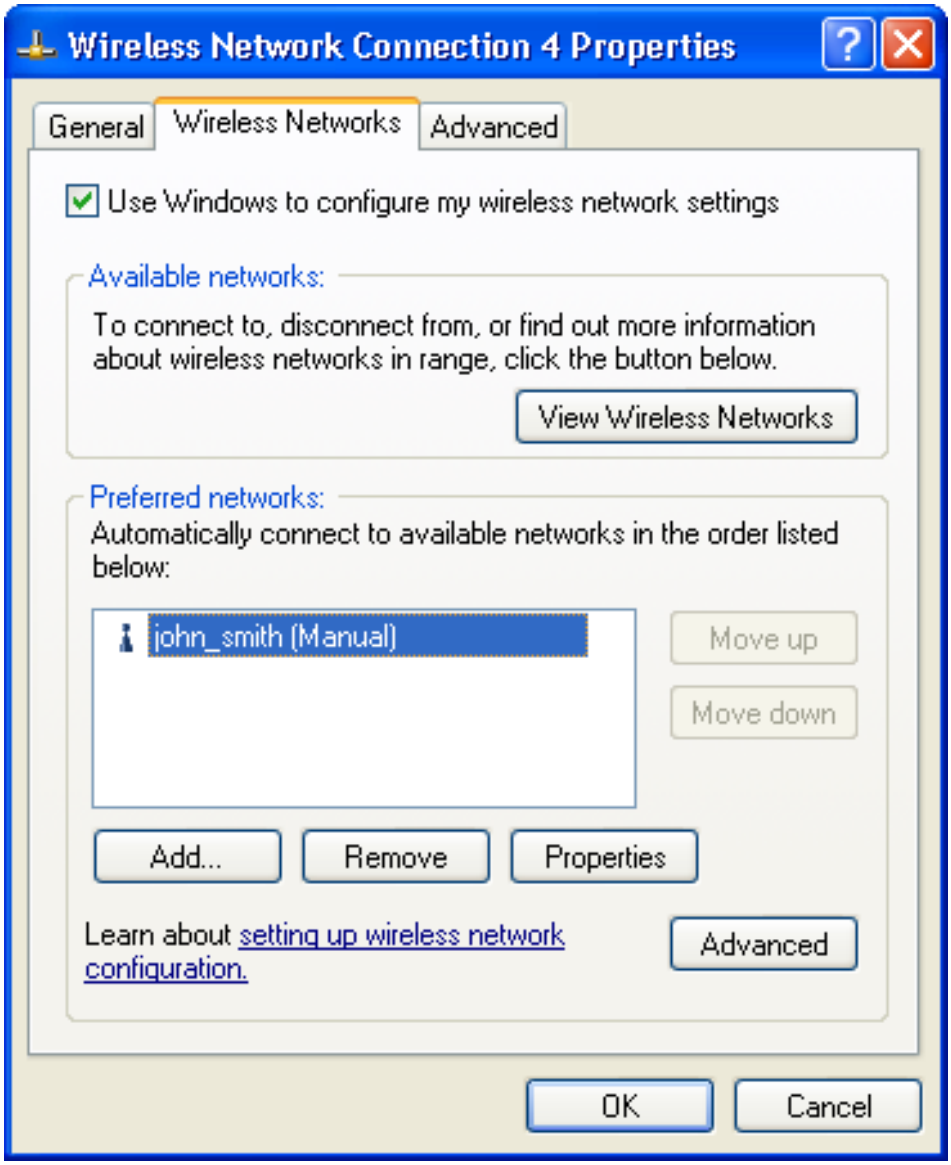


Figure 7.500. Wireless Network Connection Properties Window

3. Click your wireless network entry and then click 'Properties'. The connection's properties window appears.

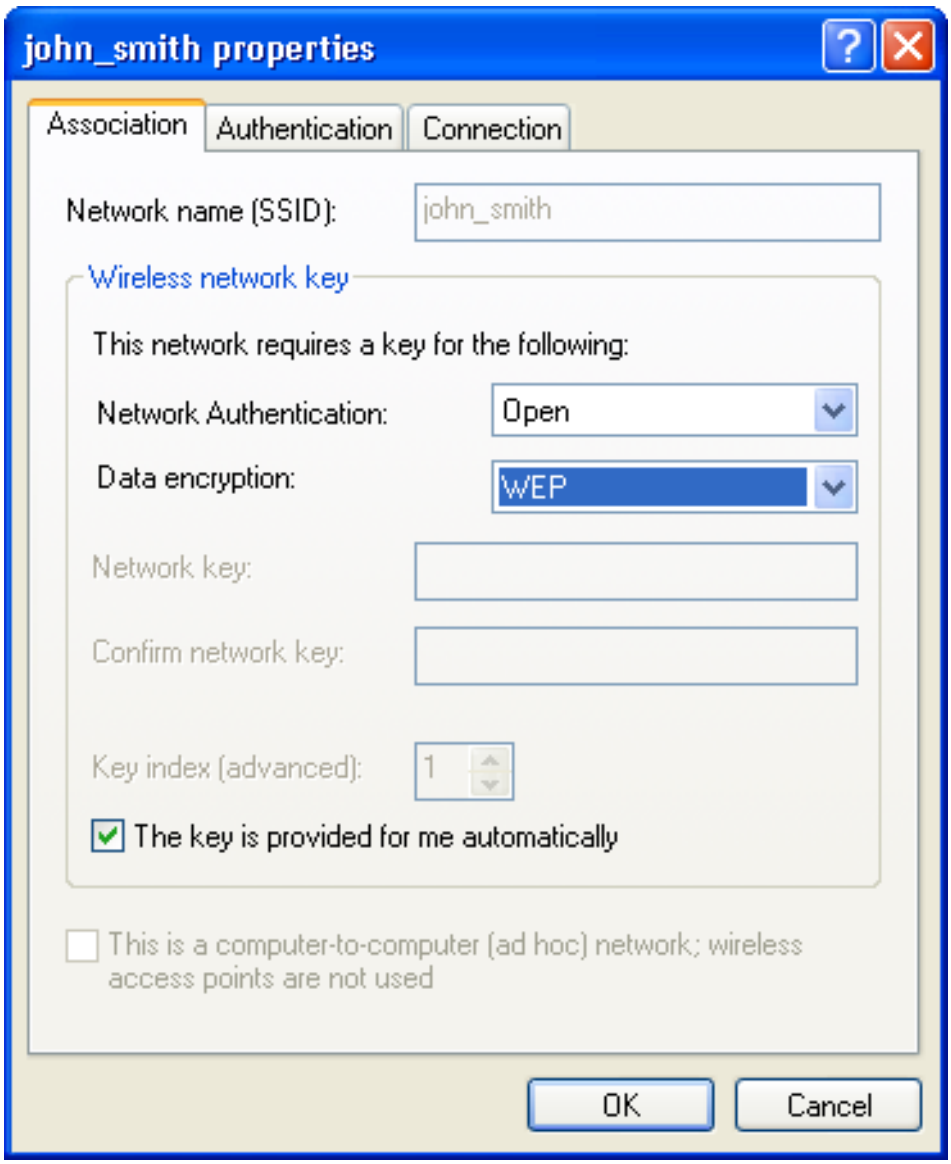


Figure 7.501. Connection Properties Window

4. Verify that your chosen data encryption method is selected. For example, if you had configured the wireless connection (in the RADIUS client) with 802.1X WEP, the 'Data encryption' combo box should display "WEP".

5. Verify that "The key is provided for me automatically" check box is selected.

6. Click the 'Authentication' tab. Verify that the 'Enable IEEE 802.1x' check box is selected.

The procedure now changes according to the algorithm you wish to use.

- With the **EAP PEAP MSCHAP v2** algorithm, negotiation is performed using a server's certificate and a client's user name and password.

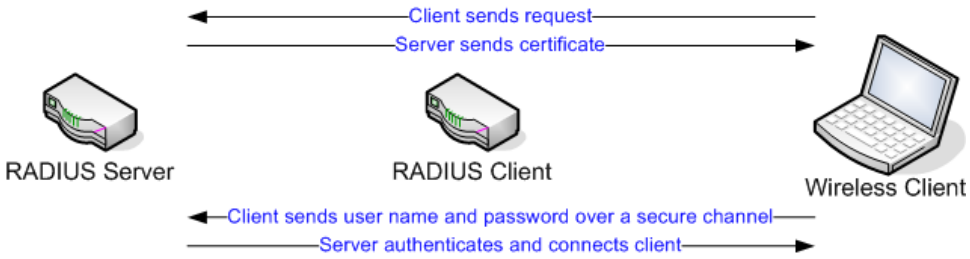


Figure 7.502. Negotiation with the EAP PEAP MSCHAP v2 Algorithm

To use this algorithm, perform the following. For the EAP TLS algorithm, refer to diagram 'Negotiations with the EAP TLS Algorighm'.

1. In the 'Authentication' tab, select the 'Protected EAP (PEAP)' option.

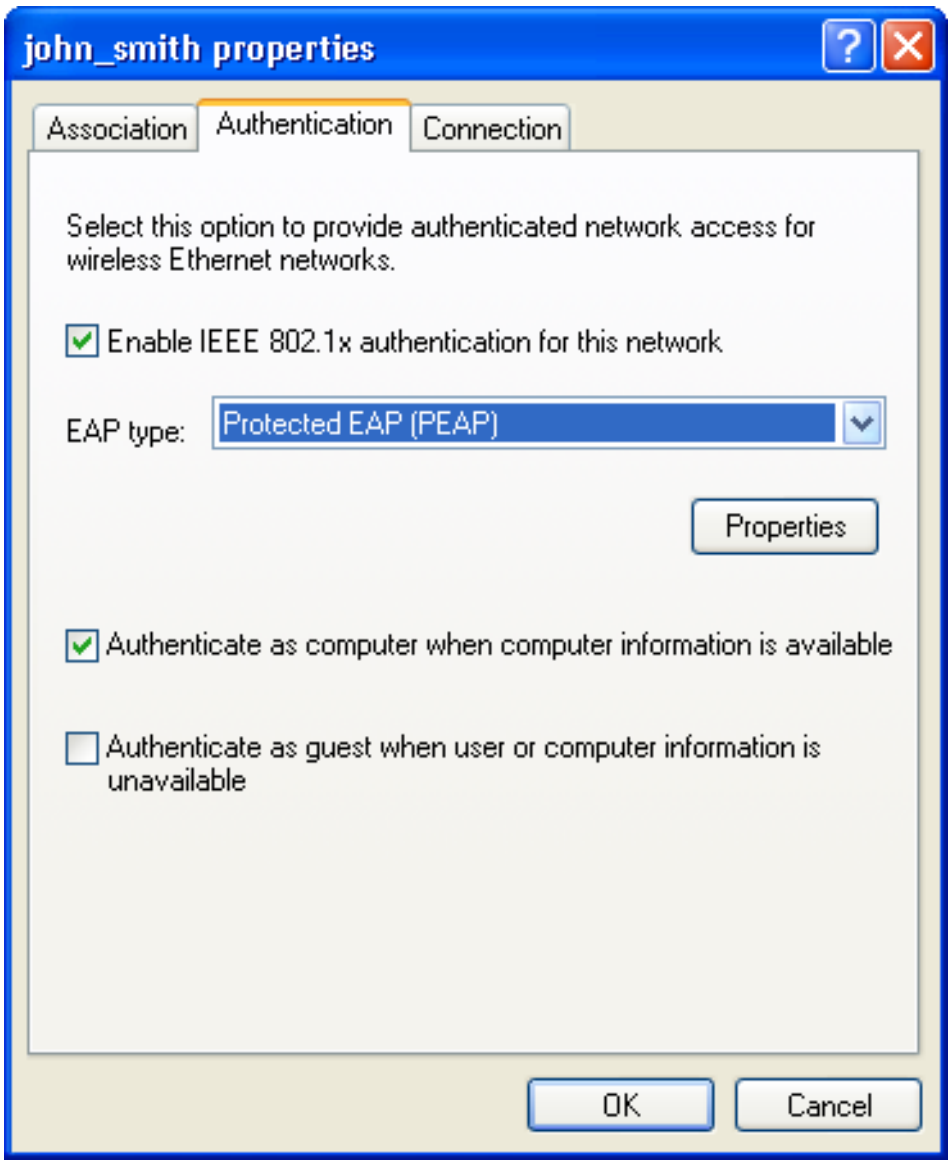


Figure 7.503. Connection Properties Window -- EAP PEAP Algorithm

2. Click 'Properties'. The 'Protected EAP Properties' window appears.

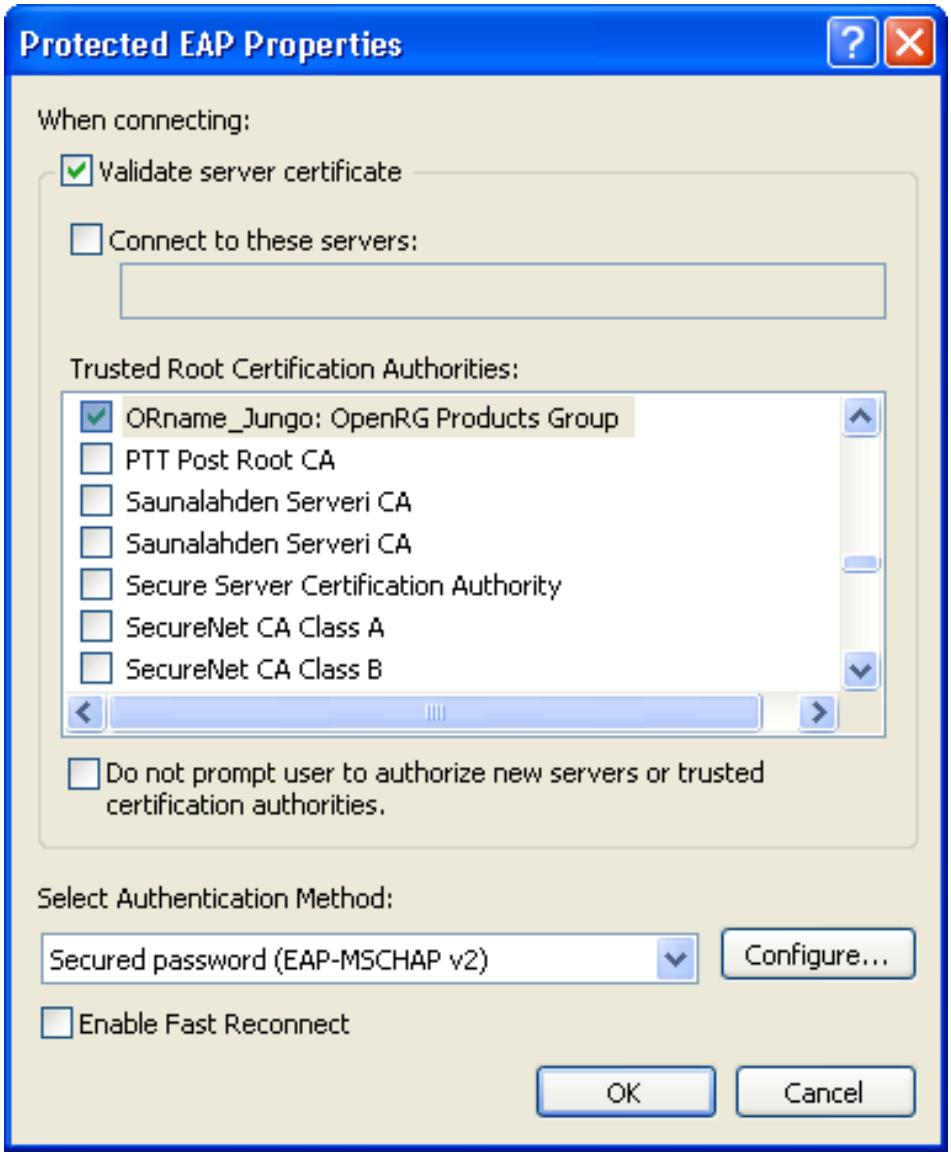


Figure 7.504. Protected EAP Properties

3. Verify that the 'Validate server certificate' check box is selected.

4. Next, you must select a Certificate Authority (CA) by which Windows will verify the RADIUS server. In order for OpenRG's CA to appear in the 'Trusted Root Certification Authorities' list as depicted in figure Figure 7.504 , you must first load the certificate information from the OpenRG RADIUS server to Windows. Perform the following:

    1. In the OpenRG RADIUS server WBM, click the 'Certificates' icon in the 'Advanced' screen. The 'Certificates' screen appears, displaying OpenRG's default certificate under the 'OpenRG's Local' tab.

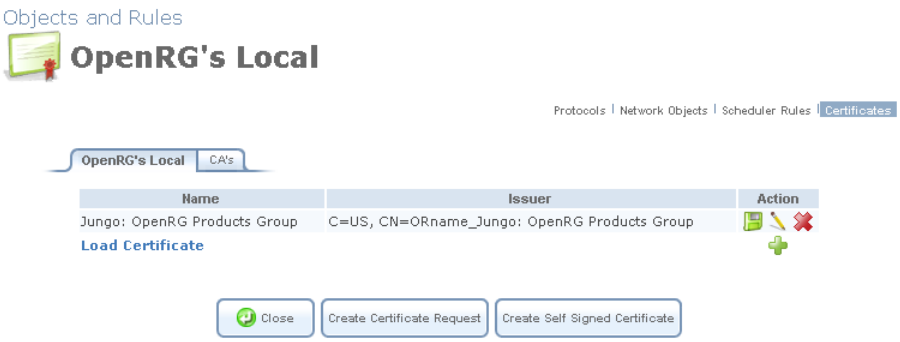


Figure 7.505. Certificates

2. Click the action icon of the certificate entry, and select 'Open' in the download dialogue window. The 'Certificate' window appears.

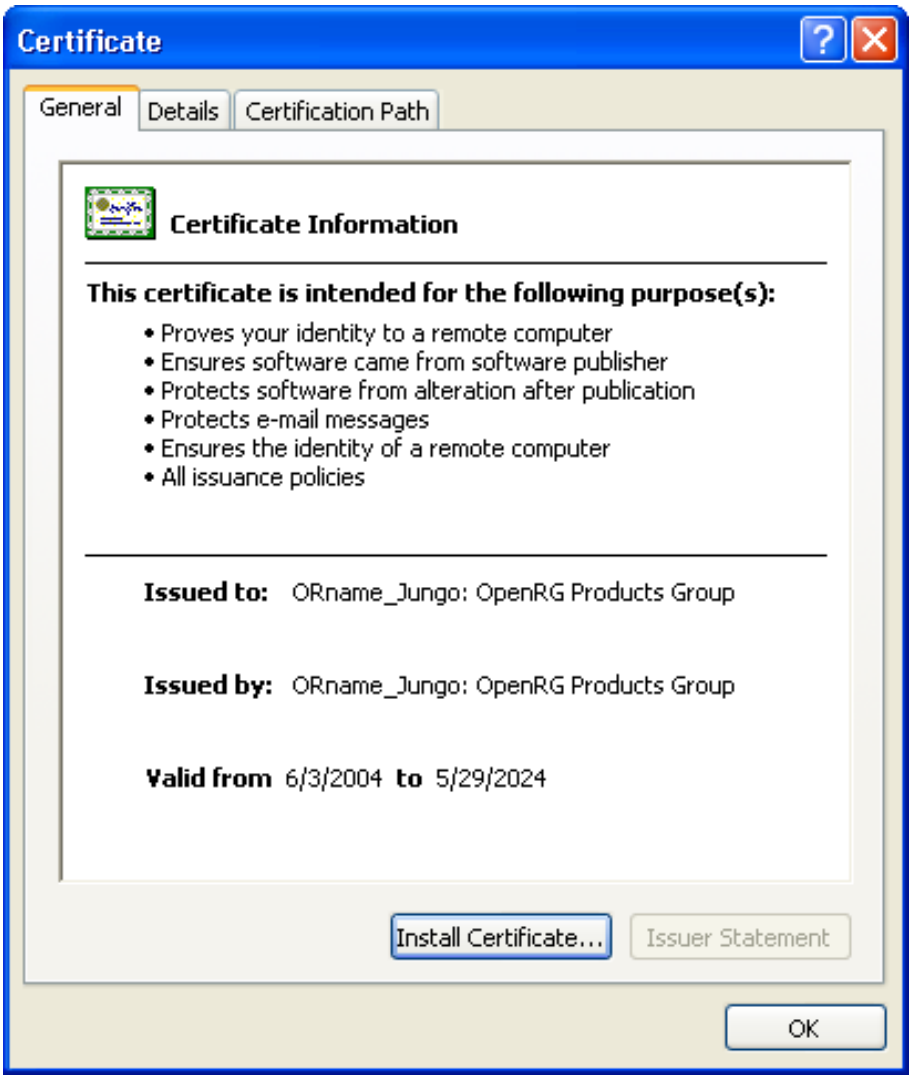

Certificate
General
Details
Certification Path
Certificate Information
This certificate is intended for the following purpose(s):
• Proves your identity to a remote computer
• Ensures software came from software publisher
• Protects software from alteration after publication
• Protects e-mail messages
• Ensures the identity of a remote computer
• All issuance policies
Issued to: ORname_Jungo: OpenRG Products Group
Issued by: ORname_Jungo: OpenRG Products Group
Valid from 6/3/2004 to 5/29/2024
Install Certificate...
Issuer Statement
OK

Figure 7.506. Cerificate

3. Click 'Install Certificate...'. The 'Certificate Import Wizard' commences. Click 'Next', and select the 'Place all certificates in the following store' option. Click 'Browse' to select the 'Trusted Root Certification Authorities' certificate store.

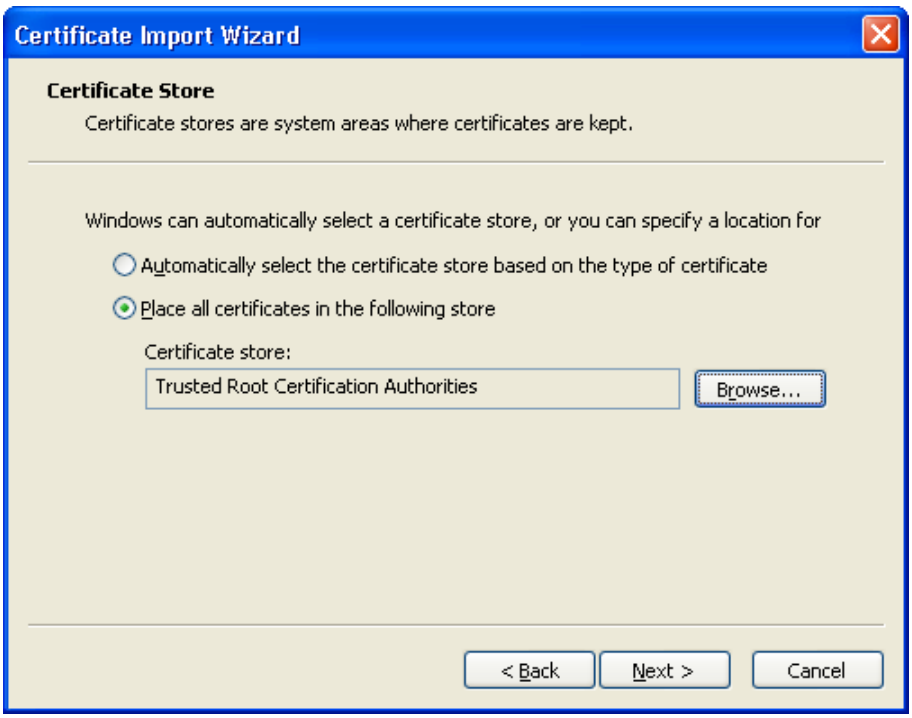

Certificate Import Wizard
Certificate Store
Certificate stores are system areas where certificates are kept.
Windows can automatically select a certificate store, or you can specify a location for
Automatically select the certificate store based on the type of certificate
Place all certificates in the following store
Certificate store:
Trusted Root Certification Authorities
Browse...
< Back
Next >
Cancel

Figure 7.507. Certificate Import Wizard

4. Complete the wizard (click 'Next' and then 'Finish').

5. Back in the 'Protected EAP Properties' window (see figure Figure 7.504), select the OpenRG CA in the 'Trusted Root Certification Authorities' list.

6. Verify that the "Secured password (EAP-MSCHAP v2)" option is selected in the 'Select Authentication Method' drop-down list, and click 'Configure...'.

7. Uncheck the 'Automatically use my Windows logon name and password' option in the dialogue window, and click 'OK'.

Figure 7.508. EAP MSCHAPv2 Properties

8. Click 'OK' on all open configuration windows.

To connect to the wireless network, click your wireless network entry in the 'Wireless Network Connection' window (see figure Figure 7.499), and then click 'Connect'. The following message bubble appears.

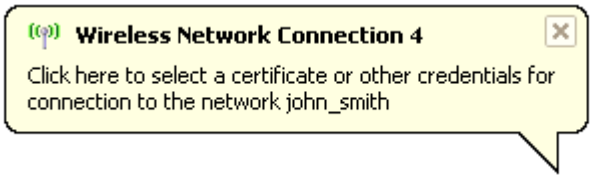

Wireless Network Connection 4
Click here to select a certificate or other credentials for connection to the network john_smith

Figure 7.509. Wireless Network Connection Message

Click the bubble. The 'Enter Credentials' window appears.

Figure 7.510. Enter Credentials

Enter a user name and password of a user with administrative permissions, predefined in the OpenRG RADIUS server users' list (leave the 'Logon domain' field empty). The wireless connection is now authenticated and established.

- With the **EAP TLS** algorithm, negotiation is performed using both server and client certificates.

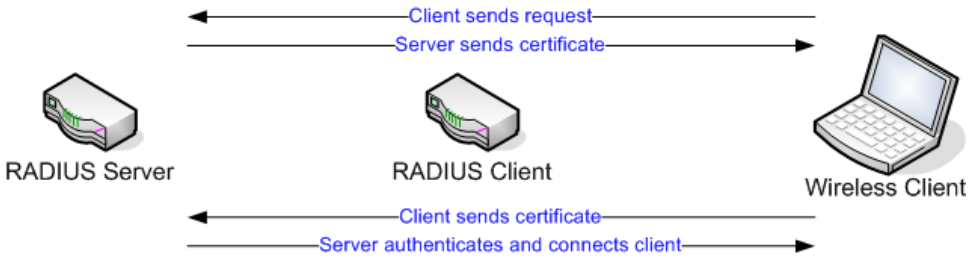


Figure 7.511. Negotiation with the EAP TLS Algorithm

To use this algorithm, perform the following.

1. In the 'Authentication' tab, select the 'Smart Card or other Certificate' option.

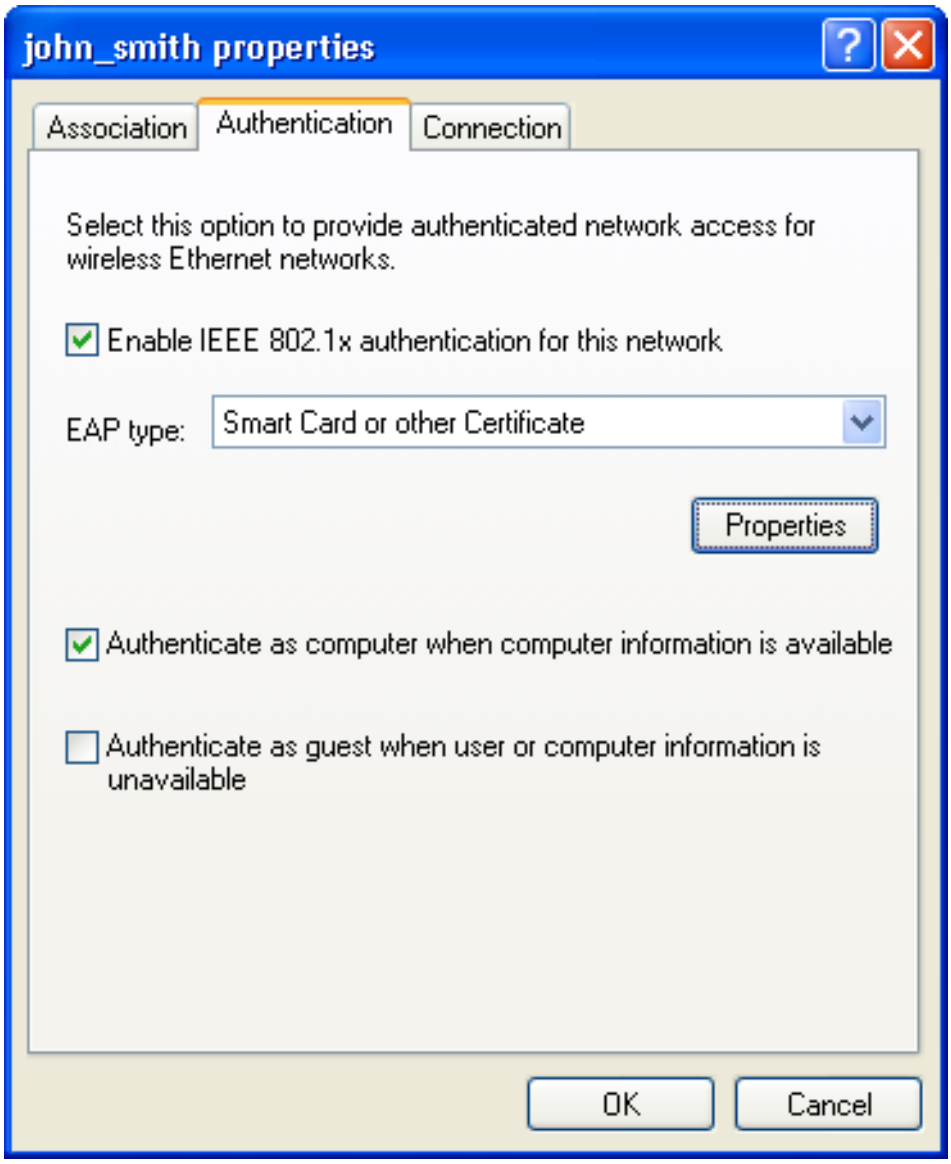

john_smith properties
Association
Authentication
Connection
Select this option to provide authenticated network access for wireless Ethernet networks.
Enable IEEE 802.1x authentication for this network
EAP type:
Smart Card or other Certificate
Properties
Authenticate as computer when computer information is available
Authenticate as guest when user or computer information is unavailable
OK
Cancel

Figure 7.512. Connection Properties Window -- EAP TLS Algorithm

2. Click 'Properties'. The 'Smart Card or other Certificate Properties' window appears.

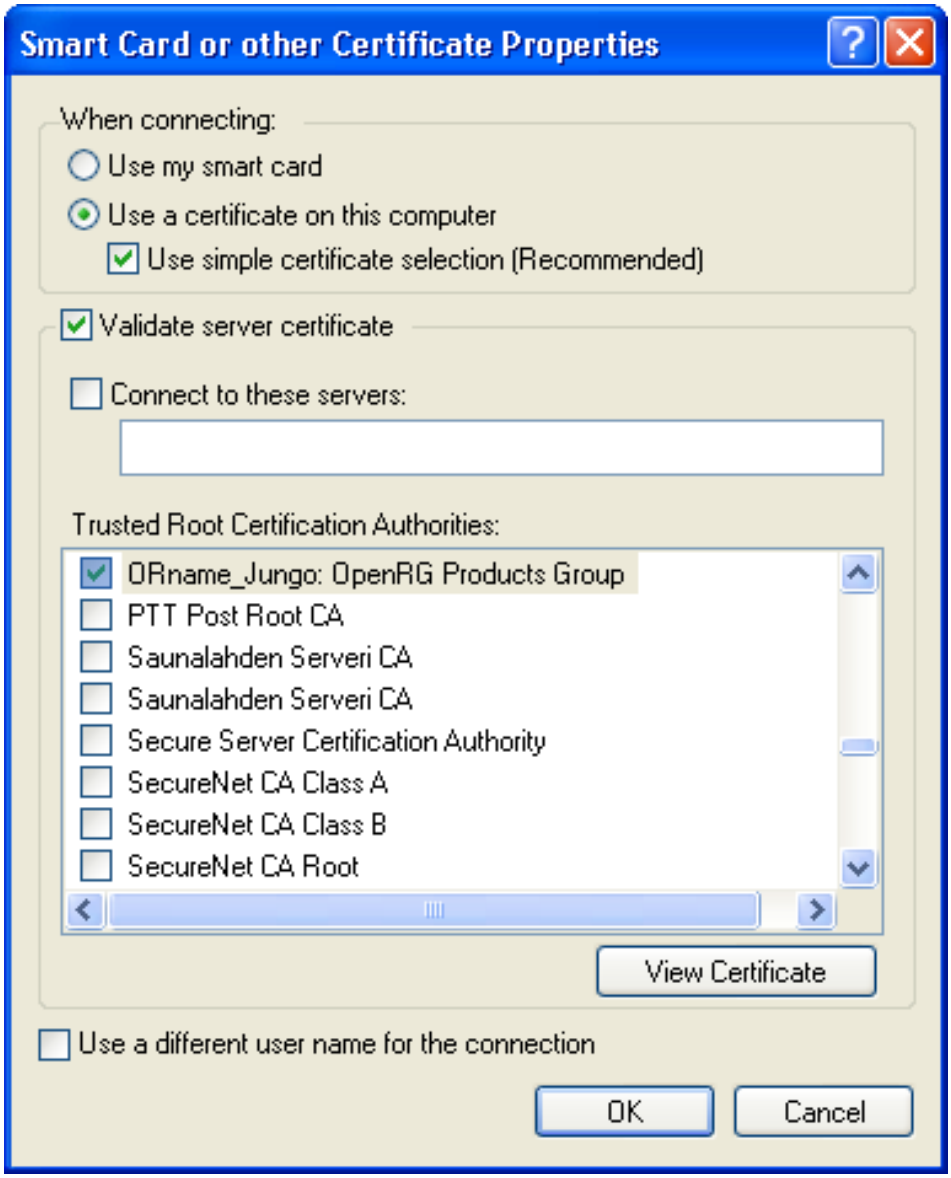


Figure 7.513. Smart Card or other Certificate Properties

3. Verify that the 'Validate server certificate' check box is selected.

4. Verify that the 'Connect to these servers' check box is not selected.

5. Next, you must select a Certificate Authority (CA) by which Windows will verify the RADIUS server. In order for OpenRG's CA to appear in the 'Trusted Root Certification Authorities' list as depicted in figure Figure 7.513 , you must first load the certificate information from the OpenRG RADIUS server to Windows. This procedure is identical to the one described in the EAP PEAP MSCHAP v2 configuration above.

6. Select the OpenRG CA in the 'Trusted Root Certification Authorities' list.

7. Click 'OK' on all open configuration windows.

Since EAP TLS uses certificates for verification of both the server and the client, an additional certificate and private key must be made available for verification of the Windows client. These are commonly available in a **.p12** file, which can be obtained from a certificate authority such as Verisign OpenRG™ , and should be placed on the Windows client. A certificate that authorizes these two must then be saved on the RADIUS server. After obtaining the **.p12** file, save it on the Windows client and perform the following:

1. Load the **.p12** file.
    1. Double-click the .p12 file. The 'Certificate Import Wizard' commences.
    2. Click 'Next', and enter the private key's password.
    3. Click 'Next', and select the 'Place all certificates in the following store' option. Click 'Browse' to select the 'Personal' certificate store.

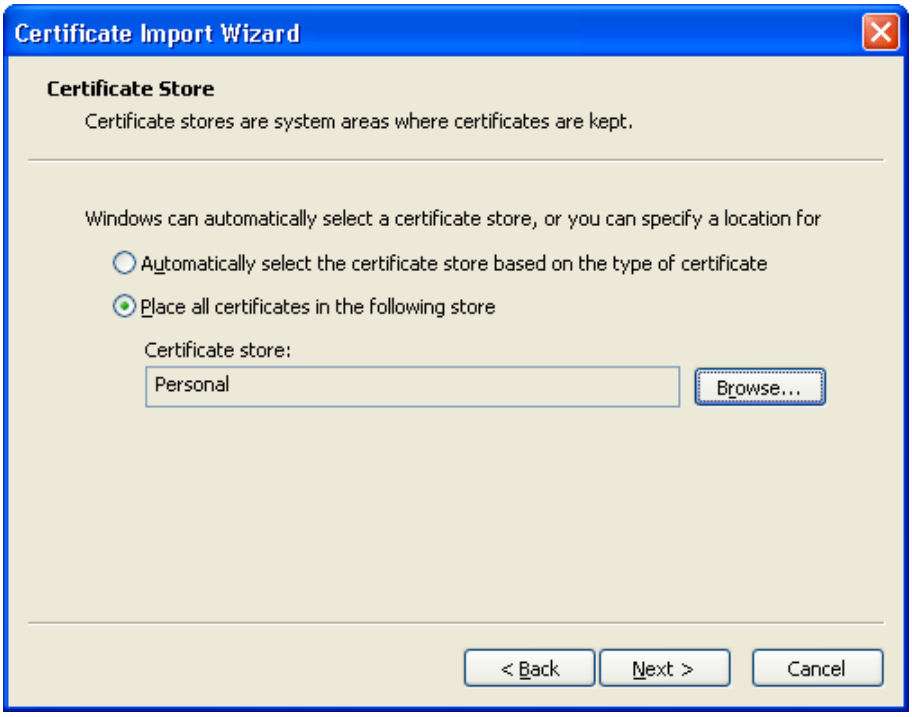

Certificate Import Wizard
Certificate Store
Certificate stores are system areas where certificates are kept.
Windows can automatically select a certificate store, or you can specify a location for
Automatically select the certificate store based on the type of certificate
Place all certificates in the following store
Certificate store:
Personal
Browse...
< Back
Next >
Cancel

Figure 7.514. Certificate Import Wizard

    4. Complete the wizard.
2. Load the authorization certificate to the RADIUS server. Note that either this certificate, or "All Trusted CAs", should be selected in the 'EAP-TLS Authentication' section of the 'RADIUS Server' screen, as described in section Section 7.13.4.2 [381] .
    1. In the OpenRG RADIUS server WBM, click the 'Certificates' icon in the 'Advanced' screen. The 'Certificates' screen appears. Click the 'CA's' tab.

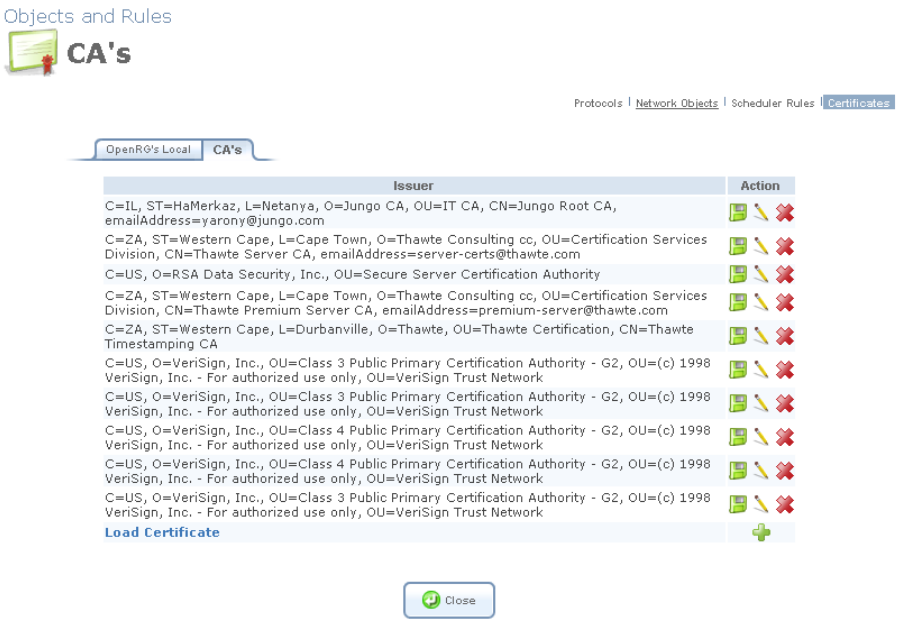

Objects and Rules
CA's
Protocols | Network Objects | Scheduler Rules | Certificates
OpenRG's Local
CA's
Issuer
Action
C=IL, ST=HaMerkaz, L=Netanya, O=Jungo CA, OU=IT CA, CN=Jungo Root CA, emailAddress=yarony@jungo.com
C=ZA, ST=Western Cape, L=Cape Town, O=Thawte Consulting cc, OU=Certification Services Division, CN=Thawte Server CA, emailAddress=server-certs@thawte.com
C=US, O=RSA Data Security, Inc., OU=Secure Server Certification Authority
C=ZA, ST=Western Cape, L=Cape Town, O=Thawte Consulting cc, OU=Certification Services Division, CN=Thawte Premium Server CA, emailAddress=premium-server@thawte.com
C=ZA, ST=Western Cape, L=Durbanville, O=Thawte, OU=Thawte Certification, CN=Thawte Timestamping CA
C=US, O=VeriSign, Inc., OU=Class 3 Public Primary Certification Authority - G2, OU=(c) 1998 VeriSign, Inc. - For authorized use only, OU=VeriSign Trust Network
C=US, O=VeriSign, Inc., OU=Class 3 Public Primary Certification Authority - G2, OU=(c) 1998 VeriSign, Inc. - For authorized use only, OU=VeriSign Trust Network
C=US, O=VeriSign, Inc., OU=Class 4 Public Primary Certification Authority - G2, OU=(c) 1998 VeriSign, Inc. - For authorized use only, OU=VeriSign Trust Network
C=US, O=VeriSign, Inc., OU=Class 4 Public Primary Certification Authority - G2, OU=(c) 1998 VeriSign, Inc. - For authorized use only, OU=VeriSign Trust Network
C=US, O=VeriSign, Inc., OU=Class 3 Public Primary Certification Authority - G2, OU=(c) 1998 VeriSign, Inc. - For authorized use only, OU=VeriSign Trust Network
Load Certificate
Close

Figure 7.515. CA's

2. Click 'Load Certificate' and then 'Browse' to locate the certificate file.

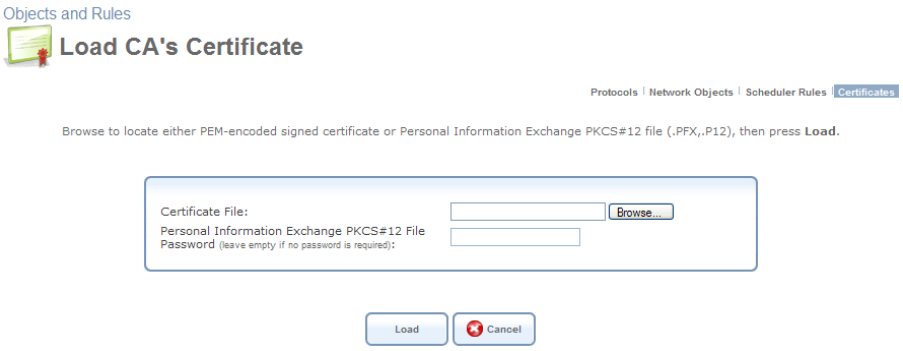

Objects and Rules
Load CA's Certificate
Protocols | Network Objects | Scheduler Rules | Certificates
Browse to locate either PEM-encoded signed certificate or Personal Information Exchange PKCS#12 file (.PFX,.P12), then press Load.
Certificate File:
Browse...
Personal Information Exchange PKCS#12 File Password (leave empty if no password is required):
Load
Cancel

Figure 7.516. Load CA's Certificate

3. Click 'Load'. The certificate is added to the list in the 'CA's' screen.

To connect to the wireless network, click your wireless network entry in the 'Wireless Network Connection' window (see figure Figure 7.499), and then click 'Connect'. A confirmation screen appears, informing of the RADIUS server's certificate. Accept the certificate to establish the connection.

8

System

8.1. Overview

The 'Overview' screen (see figure Figure 8.1) presents a summary of OpenRG's system status indication. This includes various details such as version number, release date and type of platform .

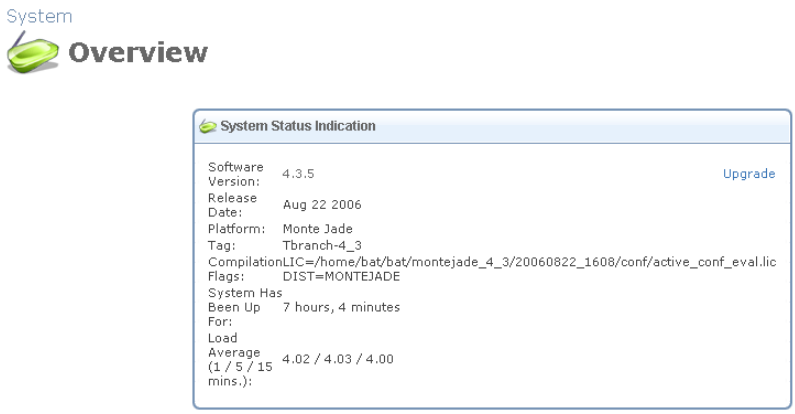

System
Overview
System Status Indication
Software Version: 4.3.5
Upgrade
Release Date: Aug 22 2006
Platform: Monte Jade
Tag: Tbranch-4_3
Compilation Flags: LIC=/home/bat/bat/montejade_4_3/20060822_1608/conf/active_conf_eval.lic DIST=MONTEJADE
System Has Been Up For: 7 hours, 4 minutes
Load Average (1 / 5 / 15 mins.): 4.02 / 4.03 / 4.00

Figure 8.1. System Monitoring Overview

8.2. Settings

8.2.1. Overview

The System Settings screen allows you to configure various system and management parameters:

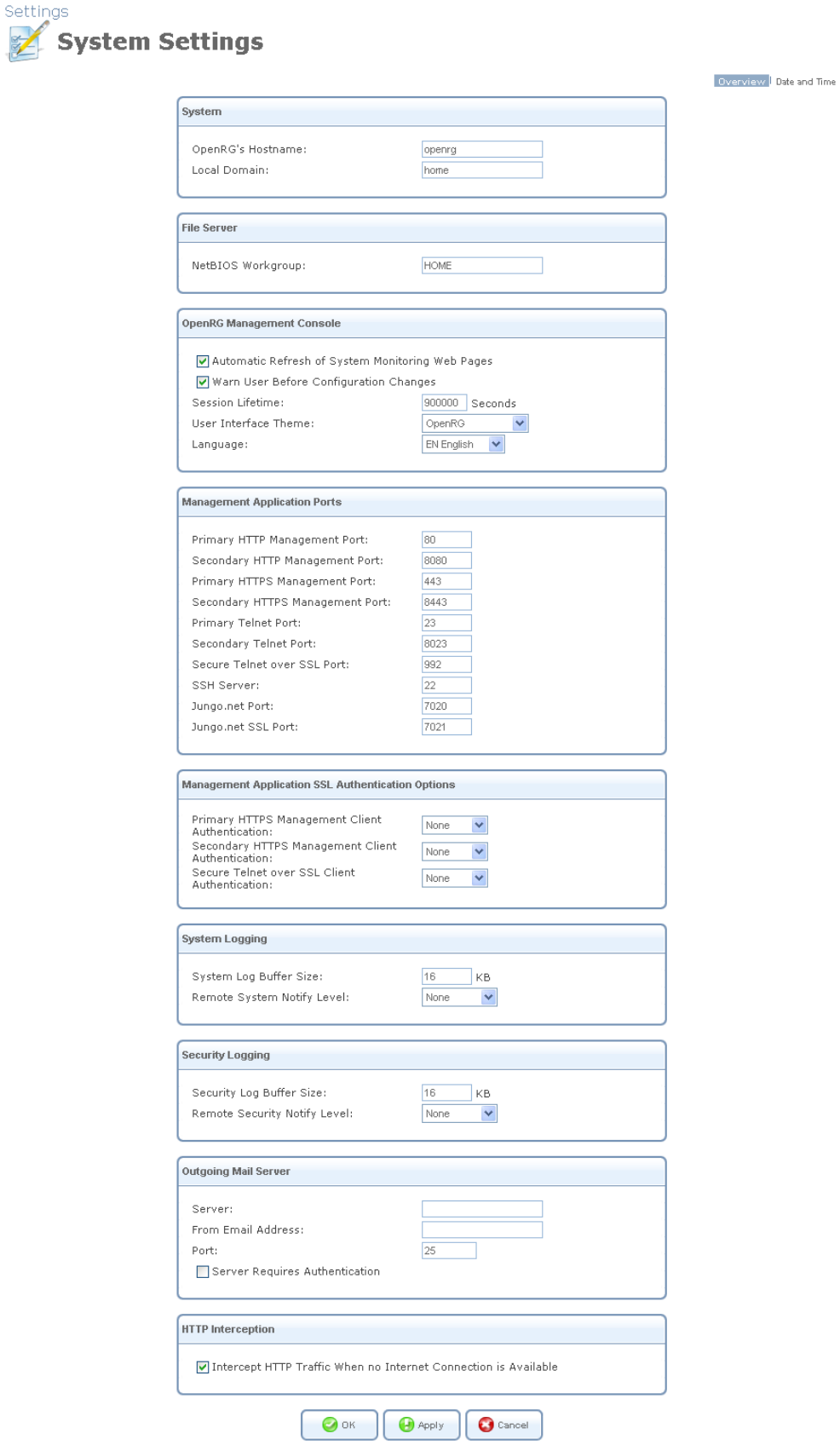


Figure 8.2. System Settings

System Configure general system parameters.

OpenRG's Hostname Specify the gateway's host name. The host name is the gateway's URL address.

Local Domain Specify your network's local domain.

File Server Name the file server workgroup.

NetBIOS Workgroup OpenRG's workgroup name that will be displayed in the Windows network map of LAN hosts.

OpenRG Management Console Configure Web-based management settings.

Automatic Refresh of System Monitoring Web Pages Select this check-box to enable the automatic refresh of system monitoring web pages.

Warn User Before Network Configuration Changes Select this check-box to activate user warnings before network configuration changes take effect.

Session Lifetime The duration of idle time (in seconds) in which the WBM session will remain active. When this duration times out, the user will have to re-login.

User Interface Theme You can select an alternative GUI theme from the list provided.

Language Select a different language for the WBM interface.

Remote Administration Use this link to access OpenRG's remote administration screen, from where you can selectively enable services that grant remote access to OpenRG (see section Section 8.7.3 [584]).

Management Application Ports Configure the following management application ports:

1. Primary/secondary HTTP ports
2. Primary/secondary HTTPS ports
3. Primary/secondary Telnet ports
4. Secure Telnet over SSL ports

Management Application SSL Authentication Options Configure the remote client authentication settings, for each of the following OpenRG management options:

- Primary HTTPS Management Client Authentication
- Secondary HTTPS Management Client Authentication
- Secure Telnet over SSL Client Authentication

The applied authentication settings can be either of the following:

None The client is not authenticated during the SSL connection. Therefore, the client does not need to have a certificate recognized by OpenRG, which can be used for authentication (for more information about certificates, refer to Section 8.9.4). This is the default setting for all of the mentioned management options.

Required The client is required to have a valid certificate, which is used instead of the regular login procedure. If the client does not have such a certificate, the connection is terminated.

Optional If the client has a valid certificate, it may be used for authentication instead of the regular login procedure. This means that in case of the HTTPS management session, the user, having a valid certificate, directly accesses the 'Network Map' screen of OpenRG's WBM. In case of the secure Telnet connection, the user, having a valid certificate, directly accesses OpenRG's CLI prompt. Note that the 'Common Name' (**CN**) parameter in the **Subject** field of a client's certificate should contain an existing username, to which administrative permissions are assigned.

System Logging Configure system logging parameters.

System Log Buffer Size Set the size of the system log buffer in Kilobytes.

Remote System Notify Level The remote system notification level can be one of the following:

- None
- Error
- Warning
- Information

Security Logging Configure security logging parameters.

Security Log Buffer Size Set the size of the security log buffer in Kilobytes.

Remote Security Notify Level The remote security notification level can be one of the following:

- None
- Error
- Warning
- Information

Outgoing Mail Server Configure outgoing mail server parameters.

Server Enter the hostname of your outgoing (SMTP) server in the 'Server' field.

From Email Address Each email requires a 'from' address and some outgoing servers refuse to forward mail without a valid 'from' address for anti-spam considerations. Enter a 'from' email address in the 'From Email Address' field.

Port Enter the port that is used by your outgoing mail server.

Server Requires Authentication If your outgoing mail server requires authentication check the 'Server Requires Authentication' check-box and enter your user name and password in the 'User Name' and 'Password' fields respectively.

HTTP Interception When no Internet connection is available, OpenRG will display an attention screen providing troubleshooting options[1]. This screen is displayed instead of the browser's standard 'The page cannot be displayed' page. For more information, refer to Section 11.1.

8.2.2. Date and Time

To configure date, time and daylight savings time settings perform the following:

1. Click the 'Date and Time' icon in the 'Advanced' screen of the Web-based Management. The 'Date and Time' settings screen is displayed.

[1]Troubleshooting options are displayed with distributions containing the "Reducing Support Calls" feature. Otherwise an explanation of the connection's status is provided.

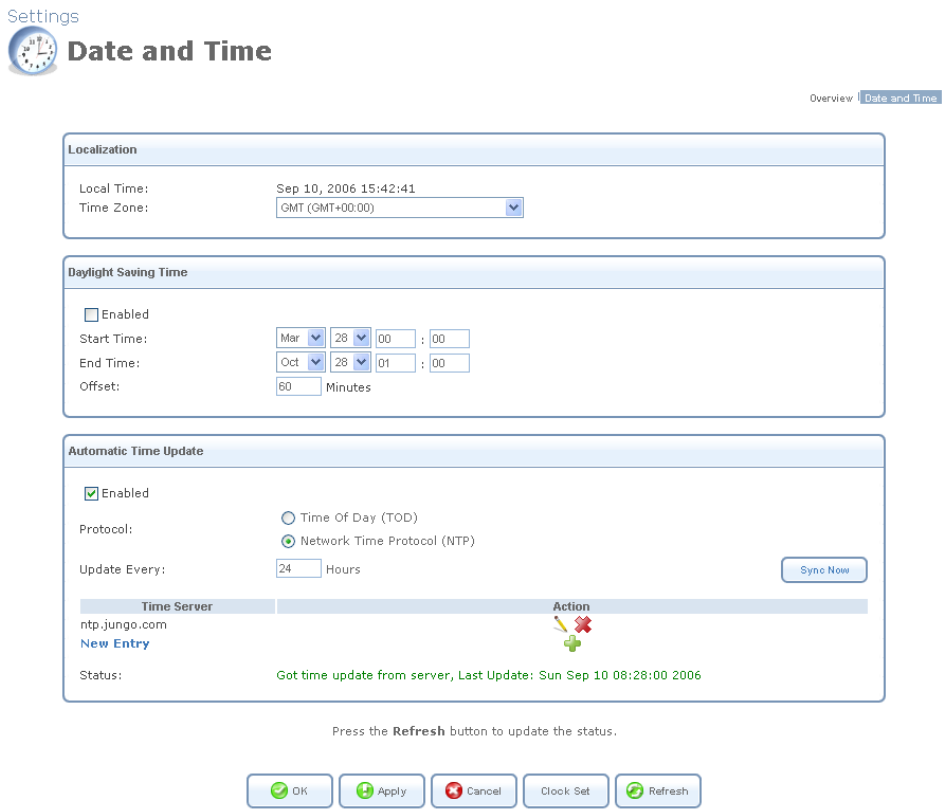


Figure 8.3. Date and Time Settings

2. Select the local time zone from the drop-down menu. OpenRG can automatically detect daylight saving setting for selected time zones. If the daylight saving settings for your time zone are not automatically detected, the following fields will be displayed:
   Enabled Select this check box to enable daylight saving time.

   Start Date and time when daylight saving starts.

   End Date and time when daylight saving ends.

   Offset Daylight saving time offset.

3. If you want the gateway to perform an automatic time update, perform the following:

   - Select the 'Enabled' check box under the 'Automatic Time Update' section.
   - Select the protocol to be used to perform the time update by selecting either the 'Time of Day' or 'Network Time Protocol' radio button.
   - In the 'Update Every' field, specify the frequency of performing the update.
   - You can define time server addresses by pressing the 'New Entry' link on the bottom of the 'Automatic Time Update' section.

In addition, OpenRG can function as a Simple Network Time Protocol (SNTP) server, enabling you to automatically update the time settings of your computers from a single but reliable source. By default, OpenRG's SNTP server is enabled. To synchronize time between the SNTP server and a PC connected to the gateway, perform the following:

1. In the 'Automatic Time Update' section of the 'Date and Time' screen (see figure Figure 8.3), click the 'Network Time Protocol (NTP)' radio button.

2. Click 'OK' to save the settings.

3. On a PC connected to the gateway, perform the following:

Note: The following explanations are based on the Windows XP user interface.

1. In Control Panel, double-click the 'Date and Time' icon. The 'Date and Time Properties' window appears.

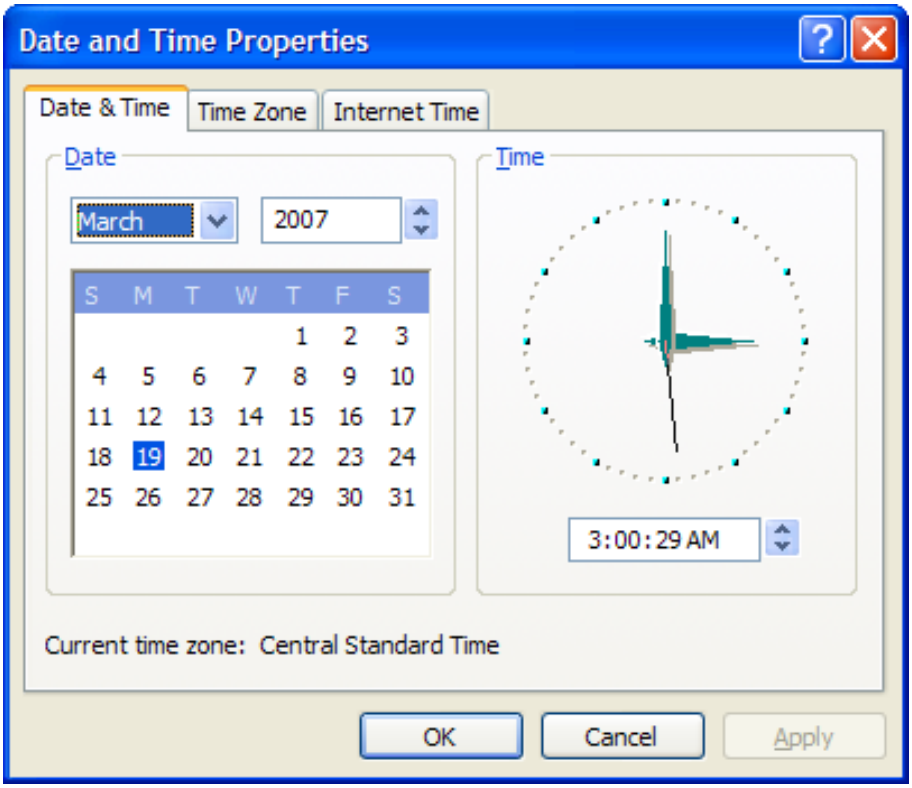


Figure 8.4. Windows--Date and Time Properties

2. Click the 'Internet Time' tab. The window changes to the following.

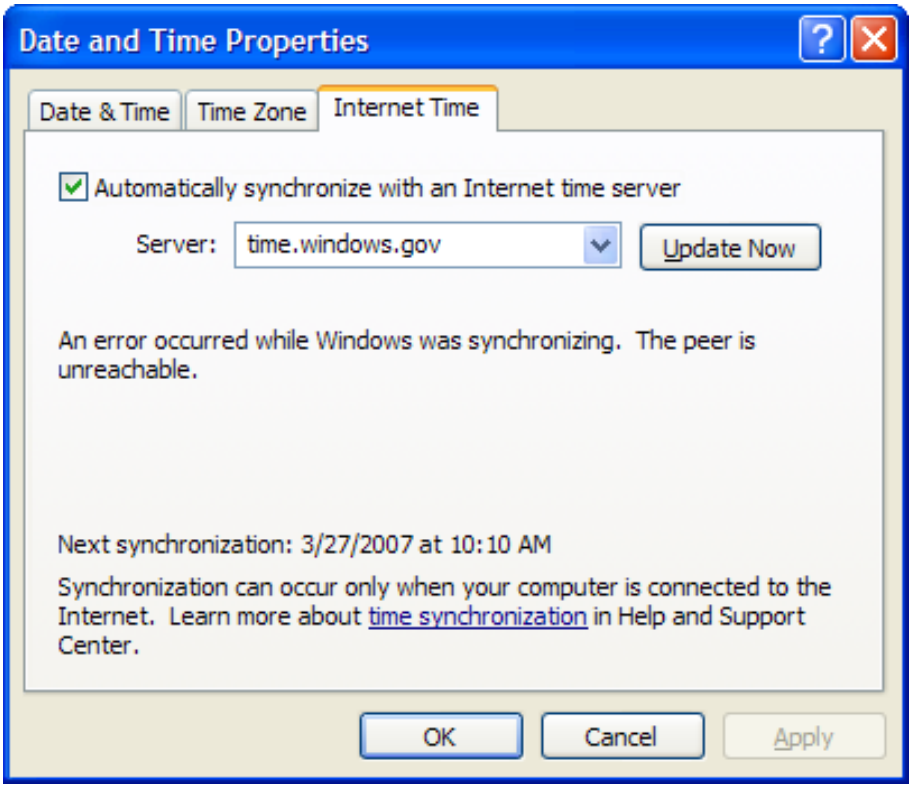

Date and Time Properties
Date & Time
Time Zone
Internet Time
Automatically synchronize with an Internet time server
Server:
time.windows.gov
Update Now
An error occurred while Windows was synchronizing. The peer is unreachable.
Next synchronization: 3/27/2007 at 10:10 AM
Synchronization can occur only when your computer is connected to the Internet. Learn more about time synchronization in Help and Support Center.
OK
Cancel
Apply

Figure 8.5. Windows--Internet Time Screen

3. In the 'Server' field, enter OpenRG's LAN IP address (The default one is 192.168.1.1).
4. Click 'Update Now'. Windows will synchronize with OpenRG's SNTP server. In addition, Windows will perform a periodical synchronization with the SNTP server.
5. Click 'OK' to save the settings.

8.3. Users

You can add, edit and delete users in the manner described in section Section 3.5 . You may also group users according to your preferences. To access the user settings, click the 'Users' icon in the 'Advanced' screen. The 'Users' screen will appear (see figure Figure 8.6). This screen lists the users and groups defined in OpenRG. The "Administrator" is a default user provided by the system.

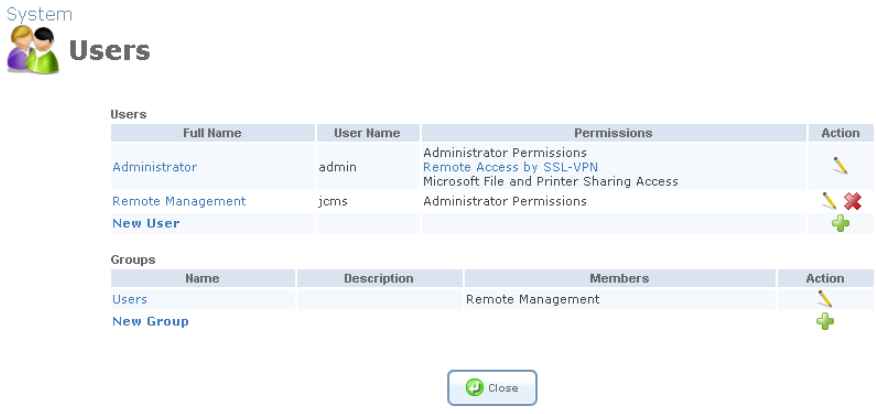


Figure 8.6. Users

8.3.1. User Settings

To add a new user, click the 'New User' link. The 'User Settings' screen appears.

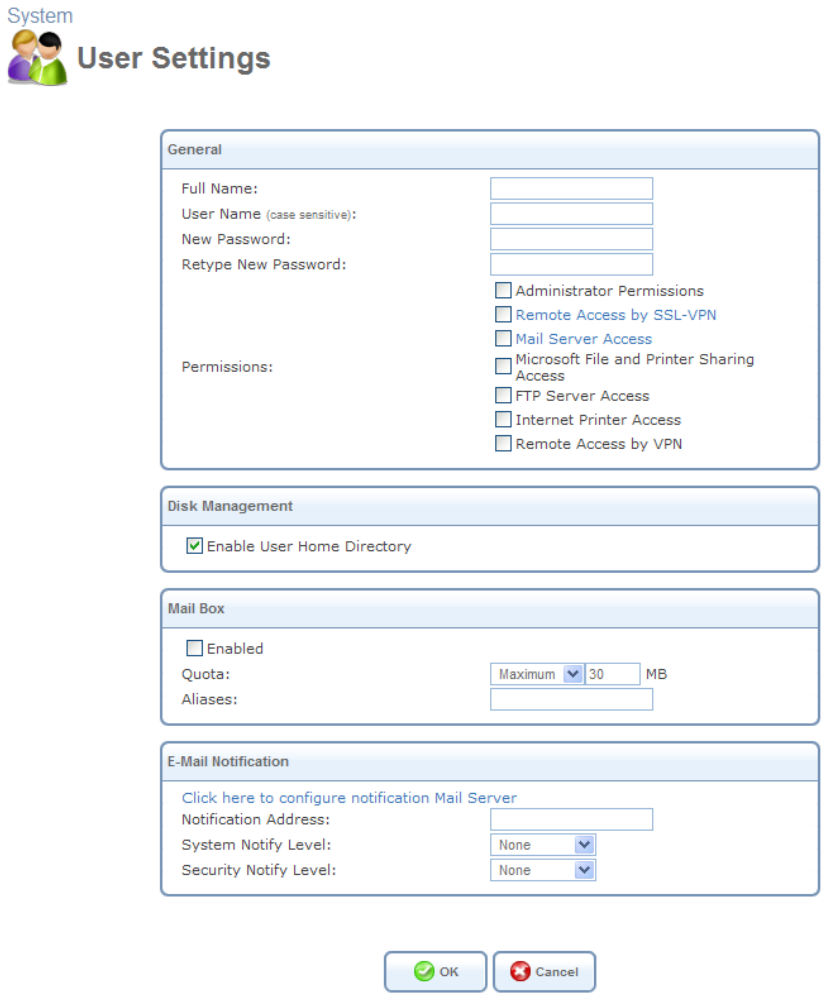


Figure 8.7. User Settings

8.3.1.1. General

Full Name The remote user's full name.

User Name The name that a user will use to access your network.

New Password The user's password.

Retype New Password If a new password is assigned, type it again to verify its correctness.

Primary Group This check-box will only appear after a user is defined, enabling you to select the primary group to which this user will belong.

Permissions Select the user's privileges on your home network.

Administrator Permissions Grants permissions to remotely modify system setting via Web-based management or Telnet.

Remote Access by SSL-VPN Grants remote access to OpenRG using the SSL-VPN protocol.

Mail Server Access Grants permission to use OpenRG's mail server. When selecting this option, you must also enable the user home directory and mailbox in the following sections.

Microsoft File and Printer Sharing Access Grants permission to use shared files and printers.

FTP Server Access Grants permission to use OpenRG's FTP server.

Internet Printer Access Grants permission to use an Internet Printing Protocol (IPP) printer.

Remote Access by VPN Grants remote access to OpenRG using the VPN protocol.

8.3.1.2. Disk Management

Enable User Home Directory By default, this option is selected. When activated, it creates a directory for the user in the 'Home' directory of the system storage area. This directory is necessary when using various applications, such as the mail server. For more information, refer to section Section 6.4.2.

8.3.1.3. Mail Box

Enabled Check or un-check this box to enable or disable this feature.

Quota Limit the user's mail box quota by entering the number of mega-bytes, or select "Unlimited" from the combo-box.

Aliases You may enter nicknames (separated by commas or spaces) for the user's email address.

8.3.1.4. E-Mail Notification

You can use email notification to receive indications of system events for a predefined severity classification. The available types of events are 'System' or 'Security' events. The available severity of events are 'Error', 'Warning' and 'Information'. If the 'Information' level is selected the user will receive notification of 'Information', 'Warning' and 'Error' events. If the 'Warning' level is selected the user will receive notification of 'Warning' and 'Error' events etc. To configure email notification for a specific user:

- First make sure you have configured an outgoing mail server in 'System Settings'. A click on the 'Configure Mail Server' link will display the 'System Settings' page were you can configure the outgoing mail server.
- Enter the user's email address in the 'Address' field in the 'Email' section.
- Select the 'System' and 'Security' notification levels in the 'System Notify Level' and 'Security Notify Level' combo boxes respectively.

8.3.2. Group Settings

You may assemble your defined users into different groups, based on different criteria -- for example, home users versus office users. By default, new users will be added to the default group "Users". To add a new group, click the 'New Group' link. The 'Group Settings' screen will appear (see figure Figure 8.8).

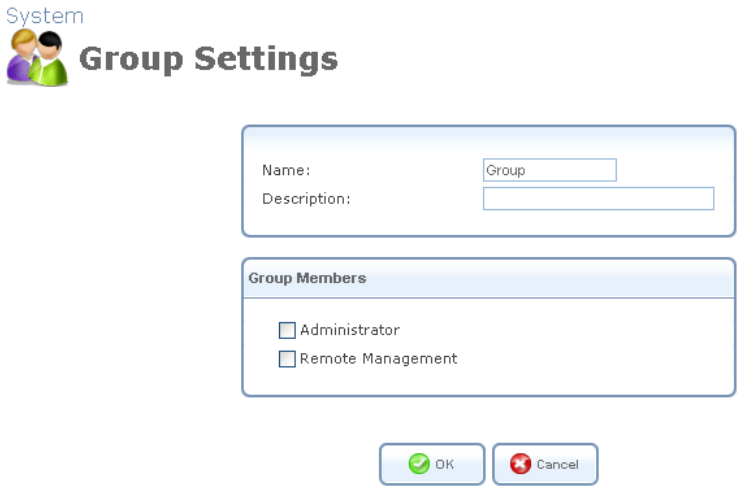


Figure 8.8. Group Settings

Name Enter a name for the group of users.

Description You may also enter a short description for the group.

Group Members Select the users that will belong to this group. All users defined are presented in this section. A user can belong to more than one group.

8.4. Network Connections

OpenRG supports various network connections, both physical and logical. The Network Connections screen enables you to configure the various parameters of your physical connections, the LAN and WAN, and create new connections, using tunneling protocols over existing connections, such as PPP and VPN. When clicking the 'Network Connections' icon on the sidebar for the first time, the following typical screen appears:

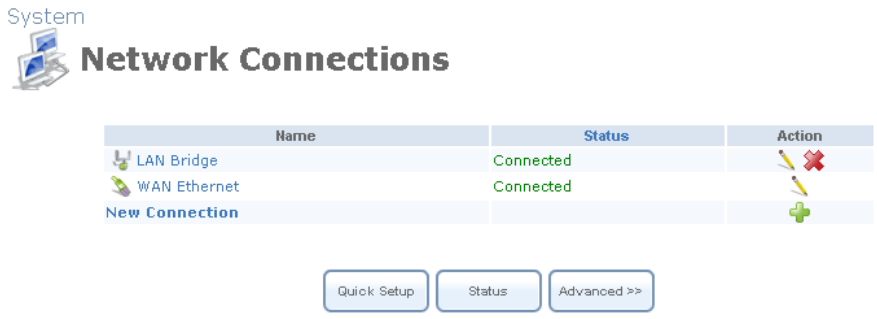


Figure 8.9. Network Connections - Basic

Press the 'Advanced' button to expand the screen and display all connection entries (see figure Figure 8.10).

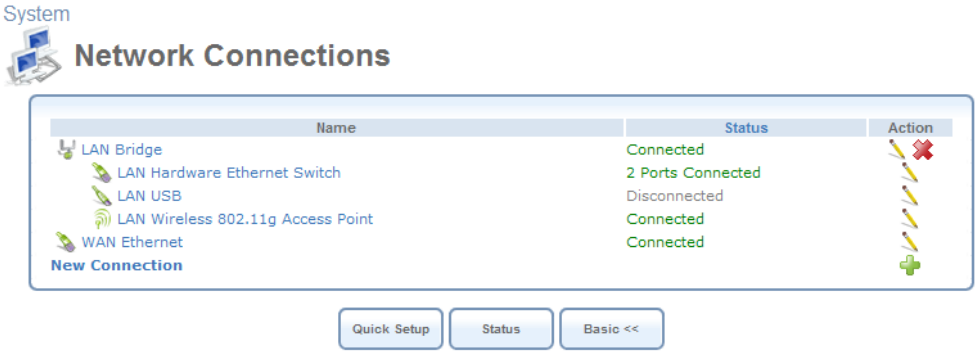


Figure 8.10. Network Connections - Advanced

This chapter describes the different network connections available with OpenRG in their order of appearance in the Network Connections screen (see figure Figure 8.10), as well as the connection types that you can create using the Connection Wizard.

Note: Some of the connections described herein may not be available with certain versions.

OpenRG's default network connections are:

- LAN - Creating a home/SOHO network
  - LAN Bridge (see section Section 8.4.3).
  - LAN Ethernet (see section Section 8.4.4).
  - LAN USB (see section Section 8.4.5).
  - LAN Wireless 802.11g Access Point (see section Section 8.4.6).
- WAN - Internet Connection
  - WAN Ethernet (see section Section 8.4.7).

The logical network connections available with OpenRG are:

- WAN - Internet Connection
  - Point-to-Point Protocol over Ethernet (see section Section 8.4.8).
  - Ethernet Connection (see section Section 8.4.9).
  - Point-to-Point Tunneling Protocol (see section Section 8.4.12).
  - Layer 2 Tunneling Protocol (see section Section 8.4.10).
  - Dynamic Host Configuration Protocol (see section Section 8.4.16).
  - Manual IP Address Configuration (see section Section 8.4.17).
  - Determine Protocol Type Automatically (see section Section 8.4.18).
  - Point-to-Point Protocol over ATM (see section Section 8.4.19).
  - Ethernet over ATM (see section Section 8.4.20).

- Classical IP over ATM (see section Section 8.4.21).
- WAN-LAN Bridge (see section Section 8.4.22).

- Virtual Private Network over the Internet
  - Layer 2 Tunneling Protocol over Internet Protocol Security (see section Section 8.4.10).
  - Layer 2 Tunneling Protocol Server (see section Section 8.4.11).
  - Point-to-Point Tunneling Protocol Virtual Private Network (see section Section 8.4.12).
  - Point-to-Point Tunneling Protocol Server (see section Section 8.4.13).
  - Internet Protocol Security (see section Section 8.4.14).
  - Internet Protocol Security Server (see section Section 8.4.15).
- Advanced Connections
  - Network Bridging (see sections Section 8.4.3 and Section 8.4.22).
  - VLAN Interface (see section Section 8.4.23).
  - Routed IP over ATM (see section Section 8.4.24).
  - Internet Protocol over Internet Protocol (see section Section 8.4.25).
  - General Routing Encapsulation (see section Section 8.4.26).

8.4.1. The Connection Wizard

The logical network connections can be easily created using the Connection Wizard. This wizard is consisted of a series of Web-based management screens, intuitively structured to gather all the information needed to create a logical connention.

8.4.1.1. Ethernet Gateway

In order to create a connection on an Ethernet gateway using the wizard, click the 'New Connection' link in the Network Connections screen. The 'Connection Wizard' screen will appear (see figure Figure 8.11).

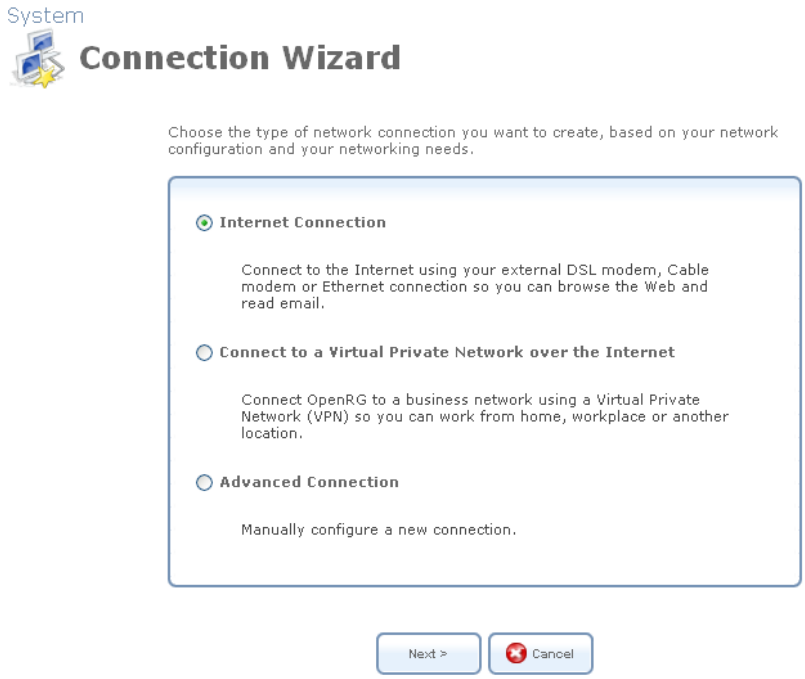

System
Connection Wizard
Choose the type of network connection you want to create, based on your network configuration and your networking needs.
Internet Connection
Connect to the Internet using your external DSL modem, Cable modem or Ethernet connection so you can browse the Web and read email.
Connect to a Virtual Private Network over the Internet
Connect OpenRG to a business network using a Virtual Private Network (VPN) so you can work from home, workplace or another location.
Advanced Connection
Manually configure a new connection.
Next >
Cancel

Figure 8.11. Connection Wizard

This screen presents you with the main connection types. Each option that you choose will lead you to further options in a tree-like formation, adding more information with each step and narrowing down the parameters towards the desired network connection.

- Internet Connection Selecting this option will take you to the 'Internet Connection' screen (see figure Figure 8.12). This section of the wizard will help you set up your Internet connection, in one of the various methods available.

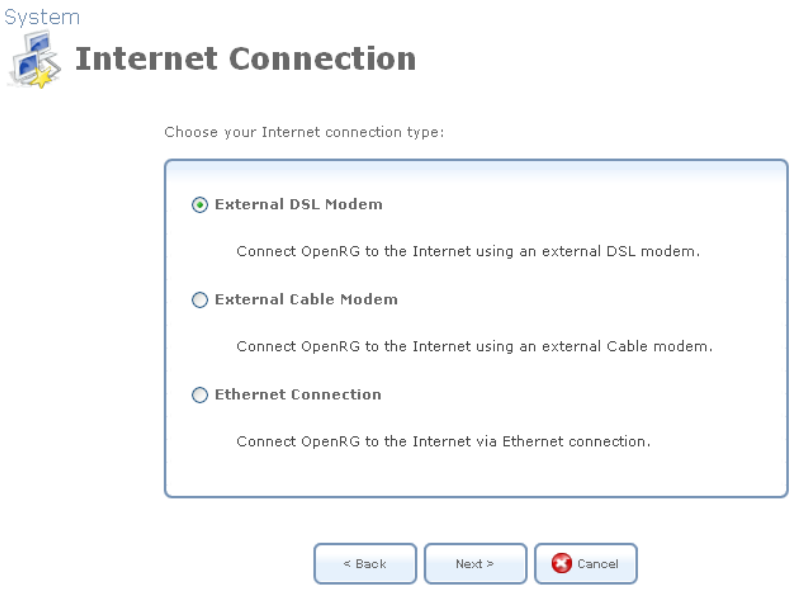

System
Internet Connection
Choose your Internet connection type:
External DSL Modem
Connect OpenRG to the Internet using an external DSL modem.
External Cable Modem
Connect OpenRG to the Internet using an external Cable modem.
Ethernet Connection
Connect OpenRG to the Internet via Ethernet connection.
< Back
Next >
Cancel

Figure 8.12. Internet Connection Wizard Screen

The tree formation of this section of the wizard is depicted in figure Figure 8.13 , where rectangles represent the steps/screens to be taken and ellipses represent the connections.

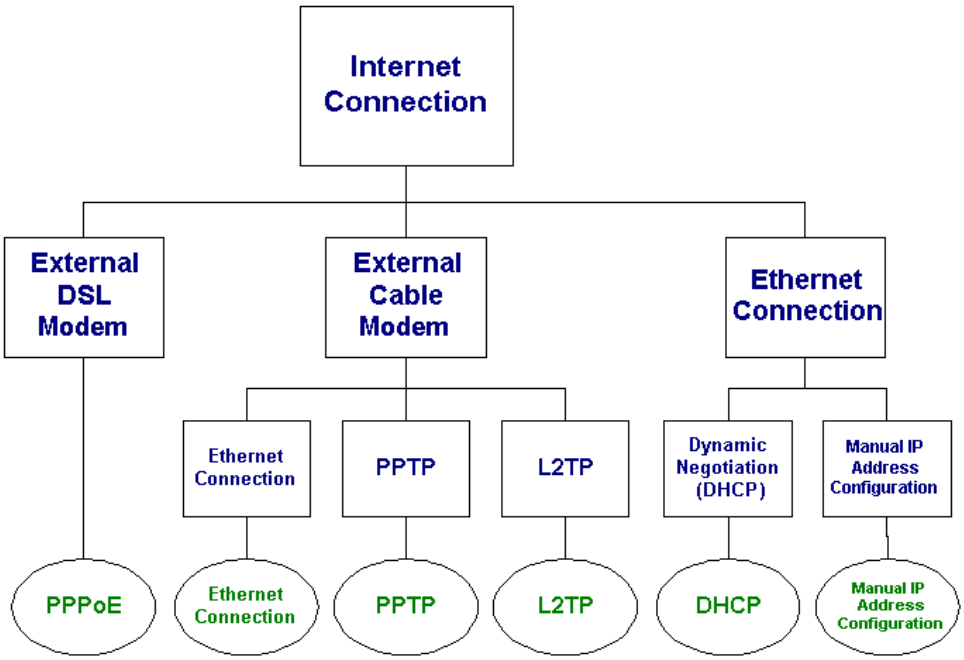


Figure 8.13. Internet Connection Wizard Tree

- Connect to a Virtual Private Network over the Internet Selecting this option will take you to the 'Connect to a Virtual Private Network over the Internet' screen (see figure Figure 8.14). This section will help you connect OpenRG to a business network using a Virtual Private Network (VPN) so you can work from home, your workplace or another location.

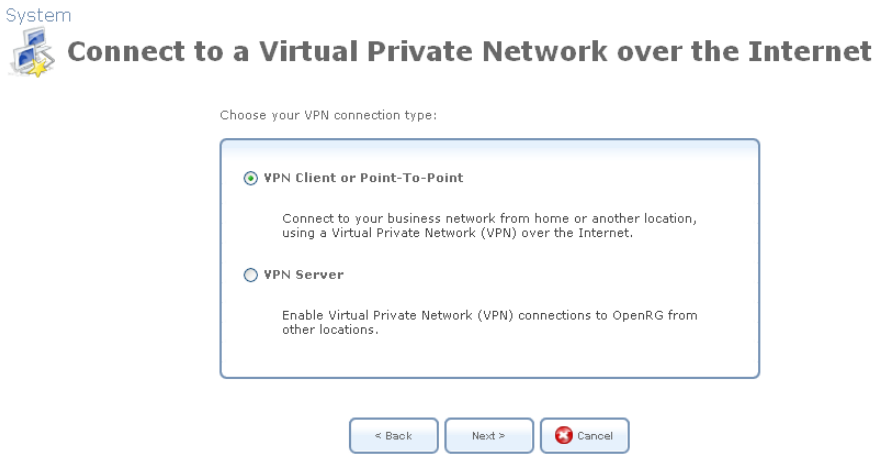

System
Connect to a Virtual Private Network over the Internet
Choose your VPN connection type:
VPN Client or Point-To-Point
Connect to your business network from home or another location, using a Virtual Private Network (VPN) over the Internet.
VPN Server
Enable Virtual Private Network (VPN) connections to OpenRG from other locations.
< Back
Next >
Cancel

Figure 8.14. VPN Wizard Screen

The tree formation of this section is depicted in figure Figure 8.15 .

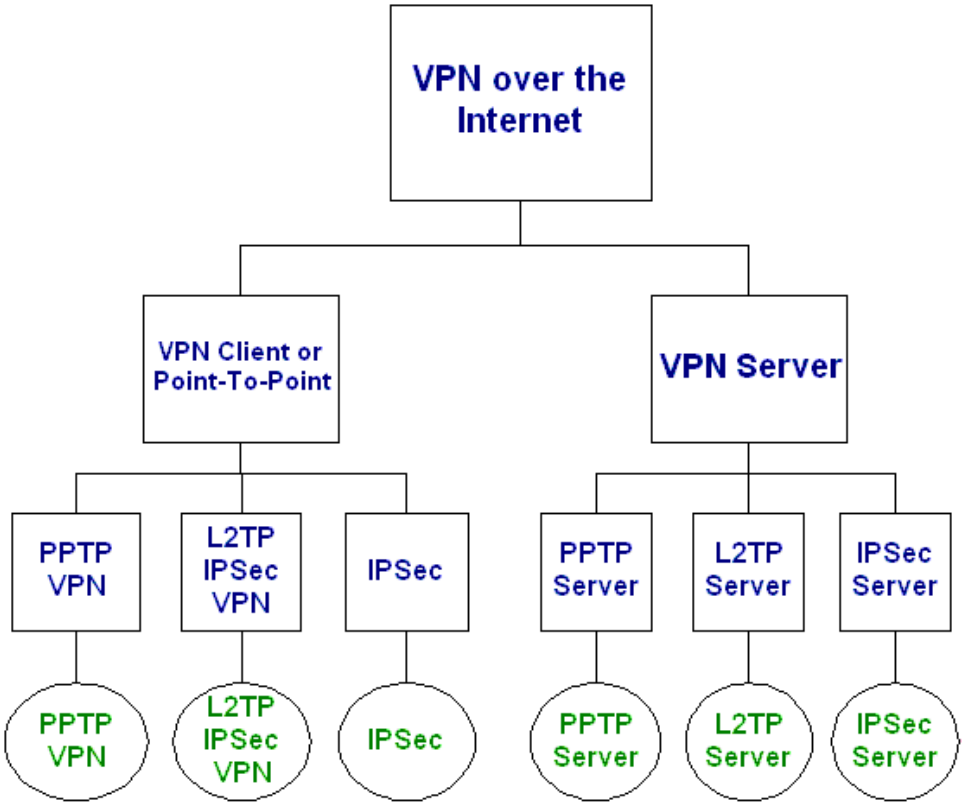


Figure 8.15. VPN Wizard Tree

- Advanced Connection Selecting this option will take you to the 'Advanced Connection' screen (see figure Figure 8.16). This section is a central starting point for all the aforementioned logical network connections. In addition, it provides the sequence for creating the Network Bridge and VLAN Interface connections.

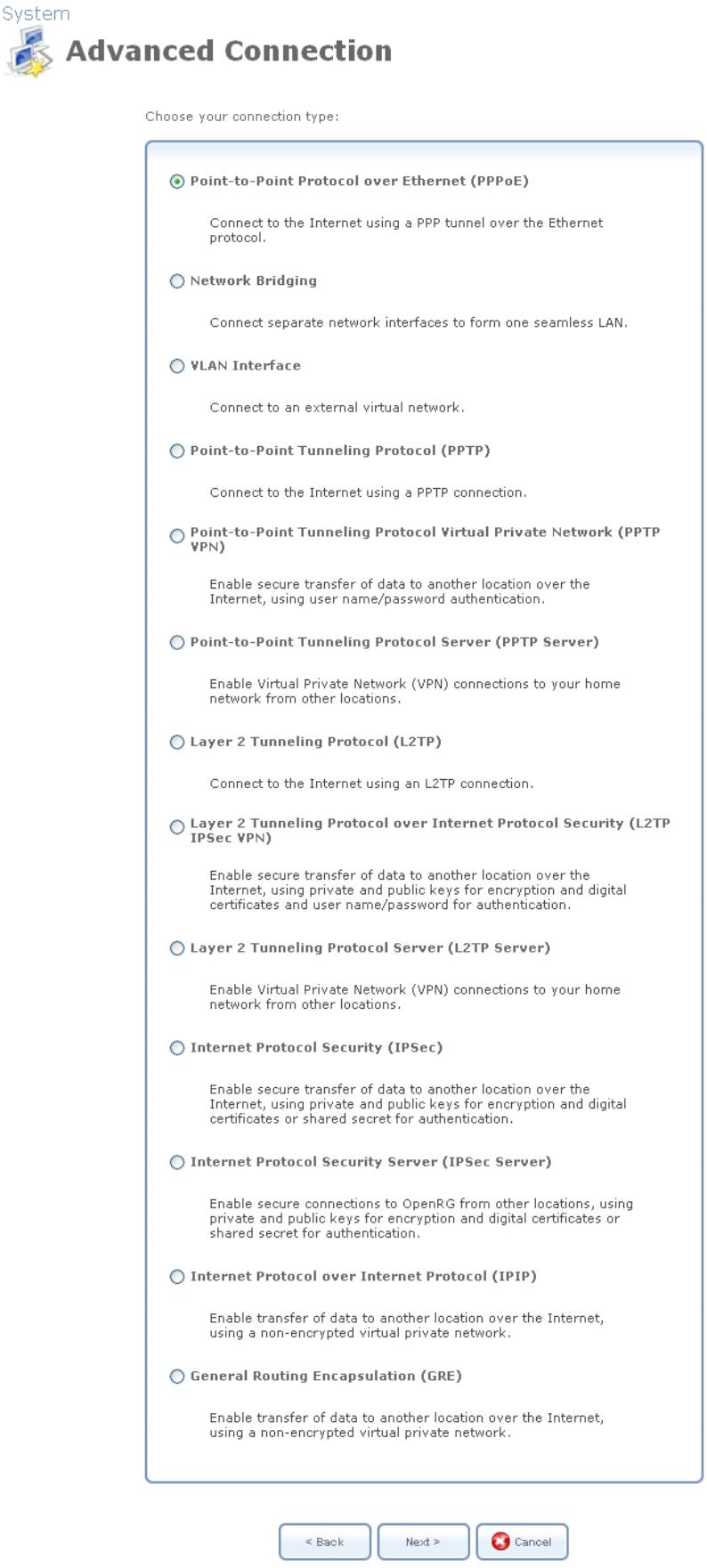

System
Advanced Connection
Choose your connection type:
Point-to-Point Protocol over Ethernet (PPPoE)
Connect to the Internet using a PPP tunnel over the Ethernet protocol.
Network Bridging
Connect separate network interfaces to form one seamless LAN.
VLAN Interface
Connect to an external virtual network.
Point-to-Point Tunneling Protocol (PPTP)
Connect to the Internet using a PPTP connection.
Point-to-Point Tunneling Protocol Virtual Private Network (PPTP VPN)
Enable secure transfer of data to another location over the Internet, using user name/password authentication.
Point-to-Point Tunneling Protocol Server (PPTP Server)
Enable Virtual Private Network (VPN) connections to your home network from other locations.
Layer 2 Tunneling Protocol (L2TP)
Connect to the Internet using an L2TP connection.
Layer 2 Tunneling Protocol over Internet Protocol Security (L2TP IPSec VPN)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates and user name/password for authentication.
Layer 2 Tunneling Protocol Server (L2TP Server)
Enable Virtual Private Network (VPN) connections to your home network from other locations.
Internet Protocol Security (IPSec)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates or shared secret for authentication.
Internet Protocol Security Server (IPSec Server)
Enable secure connections to OpenRG from other locations, using private and public keys for encryption and digital certificates or shared secret for authentication.
Internet Protocol over Internet Protocol (IPIP)
Enable transfer of data to another location over the Internet, using a non-encrypted virtual private network.
General Routing Encapsulation (GRE)
Enable transfer of data to another location over the Internet, using a non-encrypted virtual private network.
< Back
Next >
Cancel

Figure 8.16. Advanced Connection Wizard Screen

The tree formation of this section is depicted in figure Figure 8.17 .

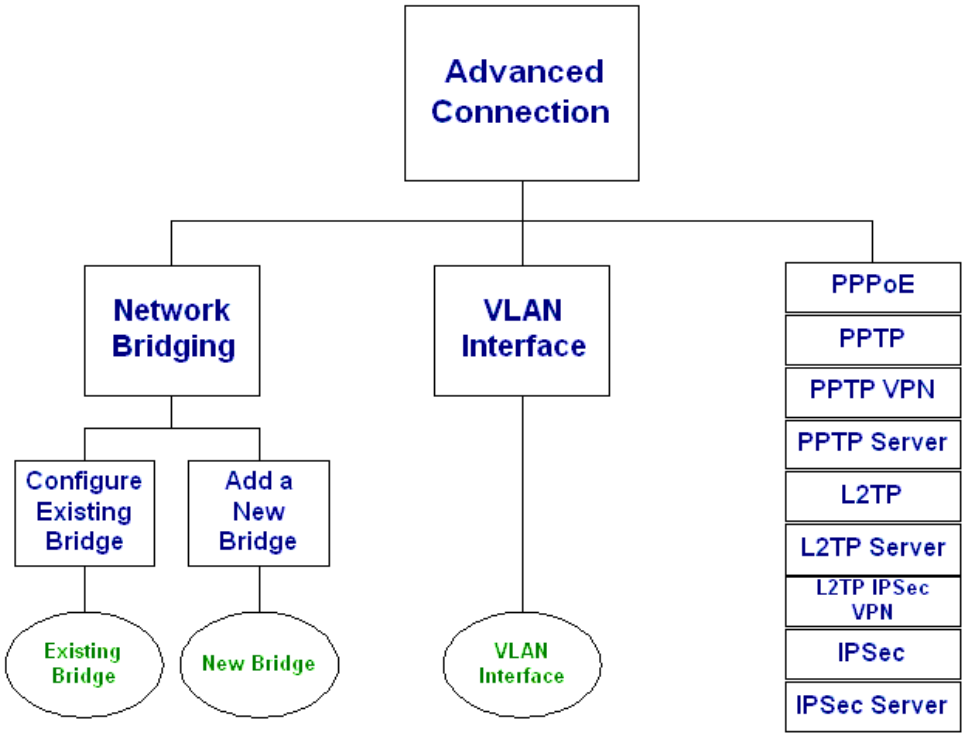


Figure 8.17. Advanced Connection Wizard Tree

Each logical connection described later in this chapter will include the "route" needed to be taken through the Connection Wizard in order for the connection to be created.

8.4.1.2. DSL Gateway

In case you are running a DSL gateway, the connection wizard will be slightly different. Click the 'New Connection' link in the Network Connections screen. The 'Connection Wizard' screen will appear (see figure Figure 8.18).

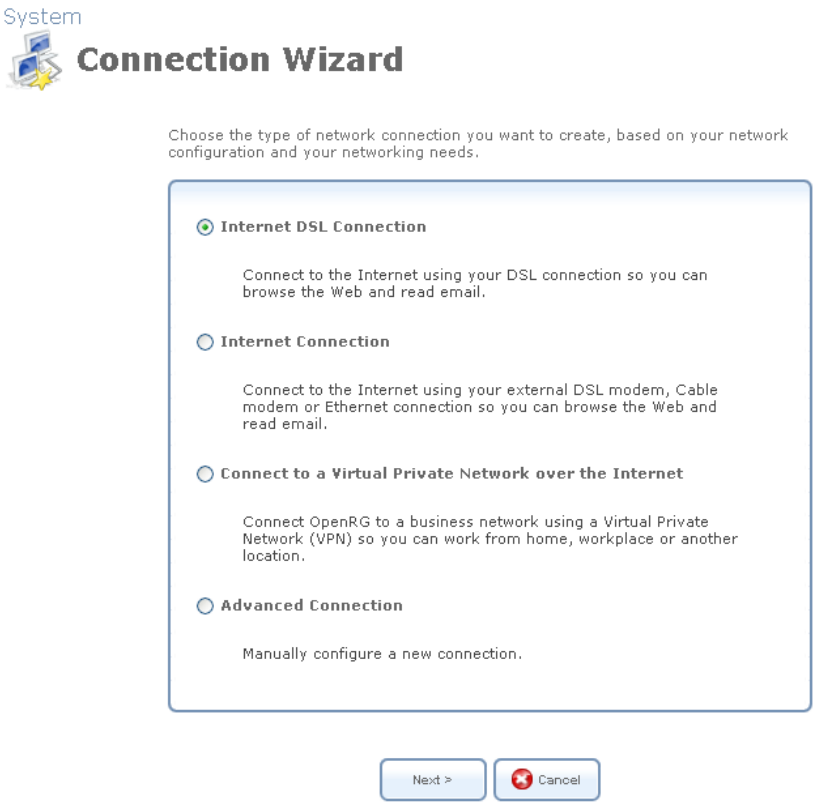

System
Connection Wizard
Choose the type of network connection you want to create, based on your network configuration and your networking needs.
Internet DSL Connection
Connect to the Internet using your DSL connection so you can browse the Web and read email.
Internet Connection
Connect to the Internet using your external DSL modem, Cable modem or Ethernet connection so you can browse the Web and read email.
Connect to a Virtual Private Network over the Internet
Connect OpenRG to a business network using a Virtual Private Network (VPN) so you can work from home, workplace or another location.
Advanced Connection
Manually configure a new connection.
Next >
Cancel

Figure 8.18. DSL Connection Wizard

- Internet DSL Connection Selecting this option will take you to the 'Internet DSL Connection' screen (see figure Figure 8.19). This section of the wizard will help you set up your DSL Internet connection, in one of the various methods available.

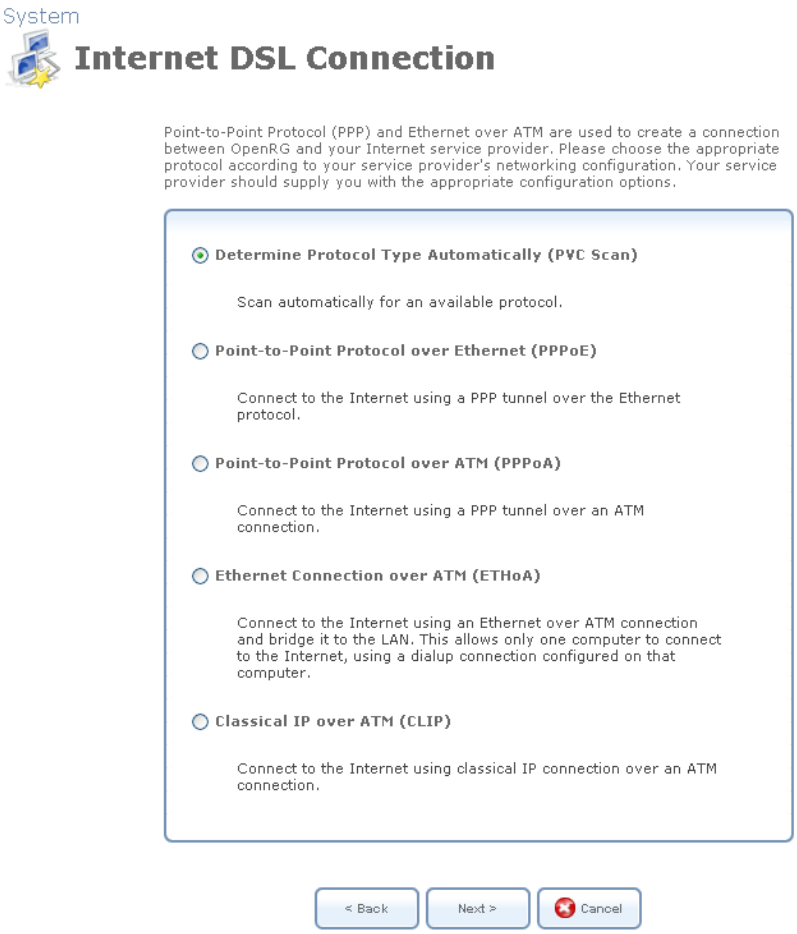

System
Internet DSL Connection
Point-to-Point Protocol (PPP) and Ethernet over ATM are used to create a connection between OpenRG and your Internet service provider. Please choose the appropriate protocol according to your service provider's networking configuration. Your service provider should supply you with the appropriate configuration options.
Determine Protocol Type Automatically (PVC Scan)
Scan automatically for an available protocol.
Point-to-Point Protocol over Ethernet (PPPoE)
Connect to the Internet using a PPP tunnel over the Ethernet protocol.
Point-to-Point Protocol over ATM (PPPoA)
Connect to the Internet using a PPP tunnel over an ATM connection.
Ethernet Connection over ATM (ETHoA)
Connect to the Internet using an Ethernet over ATM connection and bridge it to the LAN. This allows only one computer to connect to the Internet, using a dialup connection configured on that computer.
Classical IP over ATM (CLIP)
Connect to the Internet using classical IP connection over an ATM connection.
< Back
Next >
Cancel

Figure 8.19. Internet DSL Connection Wizard Screen

The tree formation of this section of the wizard is depicted in figure Figure 8.20 , where rectangles represent the steps/screens to be taken and ellipses represent the connections.

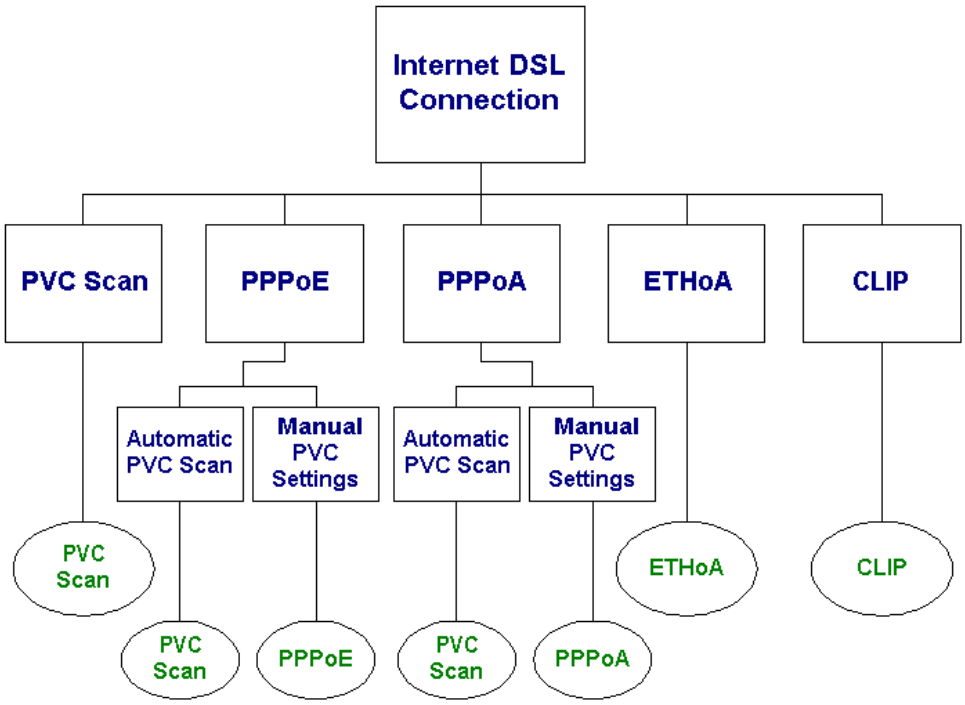


Figure 8.20. Internet DSL Connection Wizard Tree

- Internet Connection Selecting this option will take you to the 'Internet Connection' screen (see figure Figure 8.12). This section of the wizard is identical to the one of the Ethernet gateway, described in section Section 8.4.1.1 .

- Connect to a Virtual Private Network over the Internet Selecting this option will take you to the 'Connect to a Virtual Private Network over the Internet' screen (see figure Figure 8.21). This section will help you connect OpenRG to a business network using a Virtual Private Network (VPN) so you can work from home, your workplace or another location.

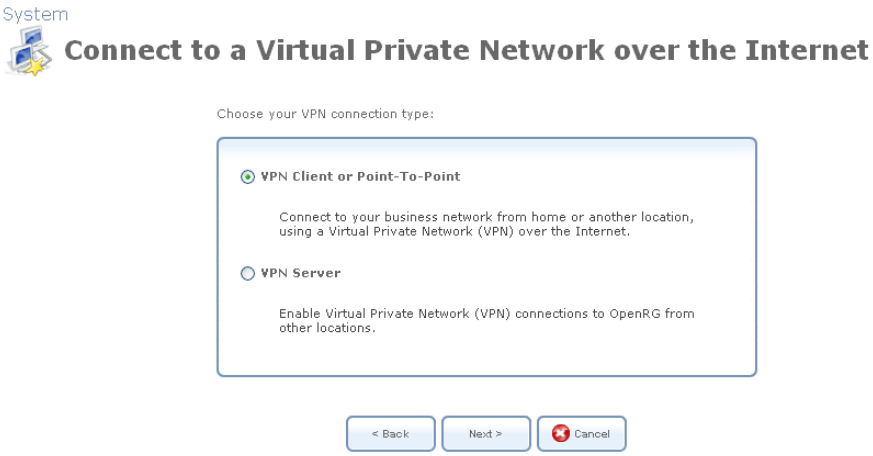

System
Connect to a Virtual Private Network over the Internet
Choose your VPN connection type:
VPN Client or Point-To-Point
Connect to your business network from home or another location, using a Virtual Private Network (VPN) over the Internet.
VPN Server
Enable Virtual Private Network (VPN) connections to OpenRG from other locations.
< Back
Next >
Cancel

Figure 8.21. VPN Wizard Screen

The tree formation of this section is depicted in figure Figure 8.22 .

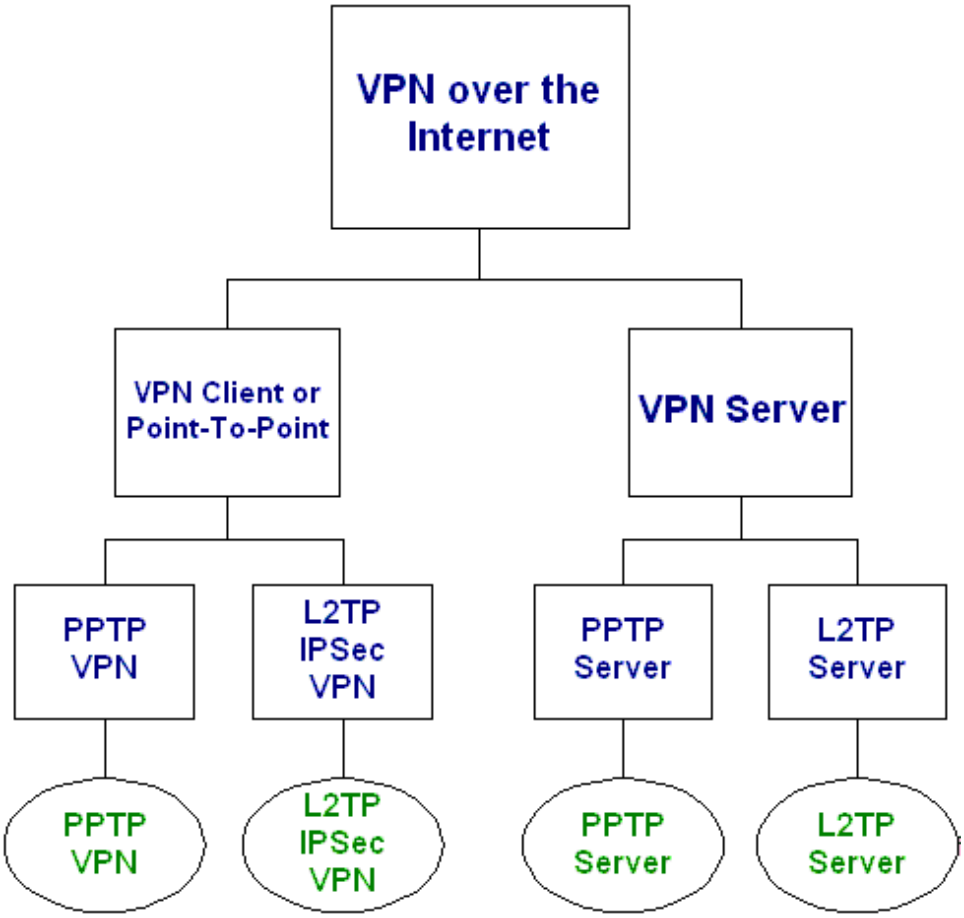
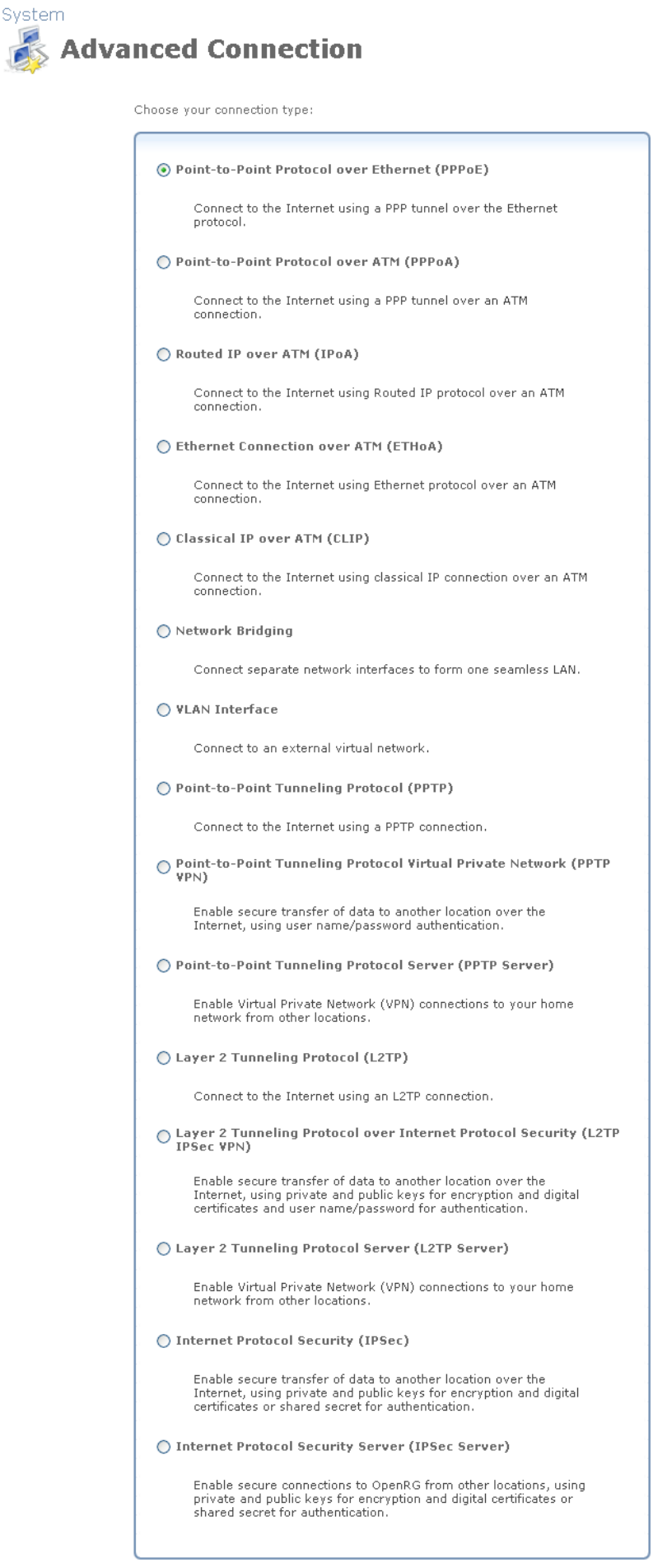


Figure 8.22. VPN Wizard Tree

- Advanced Connection Selecting this option will take you to the 'Advanced Connection' screen (see figure Figure 8.23). This section is a central starting point for all the DSL connections, and includes extra connections such as Routed IP over ATM (IPoA), Network Bridge and VLAN Interface.


System
Advanced Connection
Choose your connection type:
Point-to-Point Protocol over Ethernet (PPPoE)
Connect to the Internet using a PPP tunnel over the Ethernet protocol.
Point-to-Point Protocol over ATM (PPPoA)
Connect to the Internet using a PPP tunnel over an ATM connection.
Routed IP over ATM (IPoA)
Connect to the Internet using Routed IP protocol over an ATM connection.
Ethernet Connection over ATM (ETHoA)
Connect to the Internet using Ethernet protocol over an ATM connection.
Classical IP over ATM (CLIP)
Connect to the Internet using classical IP connection over an ATM connection.
Network Bridging
Connect separate network interfaces to form one seamless LAN.
VLAN Interface
Connect to an external virtual network.
Point-to-Point Tunneling Protocol (PPTP)
Connect to the Internet using a PPTP connection.
Point-to-Point Tunneling Protocol Virtual Private Network (PPTP VPN)
Enable secure transfer of data to another location over the Internet, using user name/password authentication.
Point-to-Point Tunneling Protocol Server (PPTP Server)
Enable Virtual Private Network (VPN) connections to your home network from other locations.
Layer 2 Tunneling Protocol (L2TP)
Connect to the Internet using an L2TP connection.
Layer 2 Tunneling Protocol over Internet Protocol Security (L2TP IPSec VPN)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates and user name/password for authentication.
Layer 2 Tunneling Protocol Server (L2TP Server)
Enable Virtual Private Network (VPN) connections to your home network from other locations.
Internet Protocol Security (IPSec)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates or shared secret for authentication.
Internet Protocol Security Server (IPSec Server)
Enable secure connections to OpenRG from other locations, using private and public keys for encryption and digital certificates or shared secret for authentication.
< Back
Next >
Cancel

The tree formation of this section is depicted in figure Figure 8.24 .

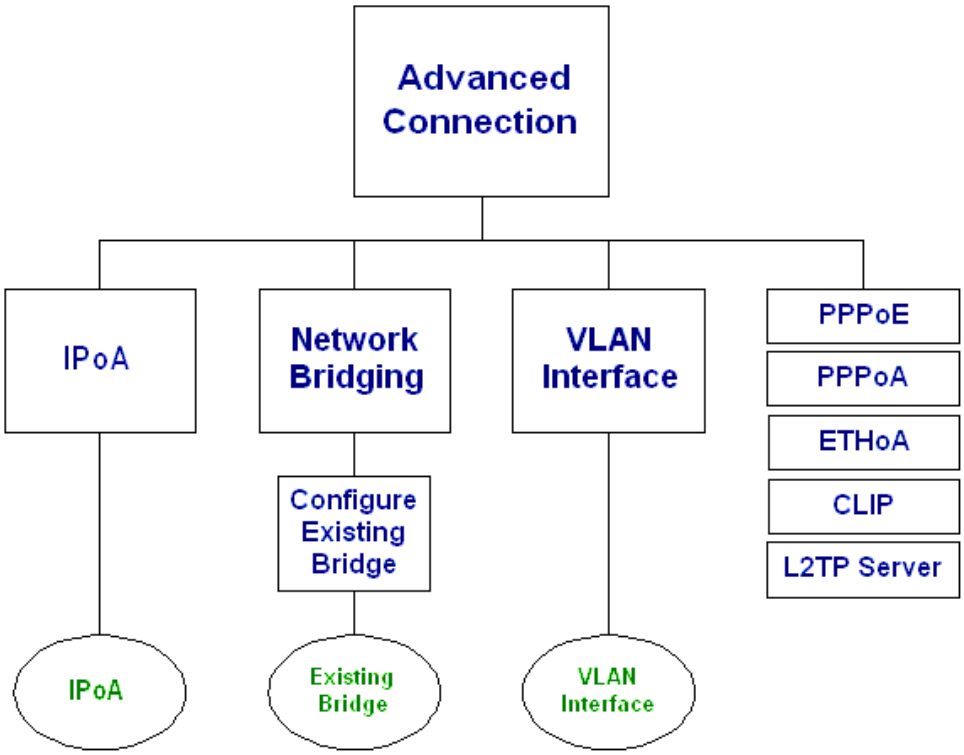


Figure 8.24. Advanced DSL Connection Wizard Tree

Each logical connection described later in this chapter will include the "route" needed to be taken through the Connection Wizard in order for the connection to be created.

8.4.2. Network Types

Every network connection in OpenRG can be configured as one of three types: WAN, LAN or DMZ. This provides high flexibility and increased functionality. For example, you may define that a LAN ethernet connection on OpenRG will operate as a WAN network. This means that all hosts in this LAN will be referred to as WAN computers, both by computers outside OpenRG and by OpenRG itself. WAN and firewall rules may be applied, such as on any other WAN network. Another example, is that a network connection can be defined as a DMZ (Demilitarized) network. Although the network is physically inside OpenRG, it will function as an unsecured, independent network, for which OpenRG merely acts as a router. One of these three network types is defined in each connection's configuration screen, in the 'Network' combo-box, as depicted in the following sections.

8.4.2.1. DMZ Network

When defining a network connection as a DMZ network, you must also:

- Remove the connection from under a bridge, if that is the case.
- Change the connection's routing mode to "Route", in the 'Routing' section of the configuration screen.
- Add a routing rule on your external gateway (which may be with your ISP) informing of the DMZ network behind OpenRG.

8.4.3. LAN Bridge

The LAN bridge connection is used to combine several LAN devices under one virtual network. For example, creating one network for LAN Ethernet and LAN wireless devices. Please note, that when a bridge is removed, its formerly underlying devices inherit the bridge's DHCP settings. For example, the removal of a bridge that is configured as DHCP client, automatically configures the LAN devices formerly constituting the bridge as DHCP clients, with the exact DHCP client configuration.

8.4.3.1. Creation with the Connection Wizard

To configure an existing bridge or create a new one, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.11).

2. Select the Advanced Connection radio button and click Next. The 'Advanced Connection' screen will appear (see figure Figure 8.16).

1. Select the Network Bridging radio button and click Next. The 'Bridge Options' screen will appear (see figure 'Bridge Options').

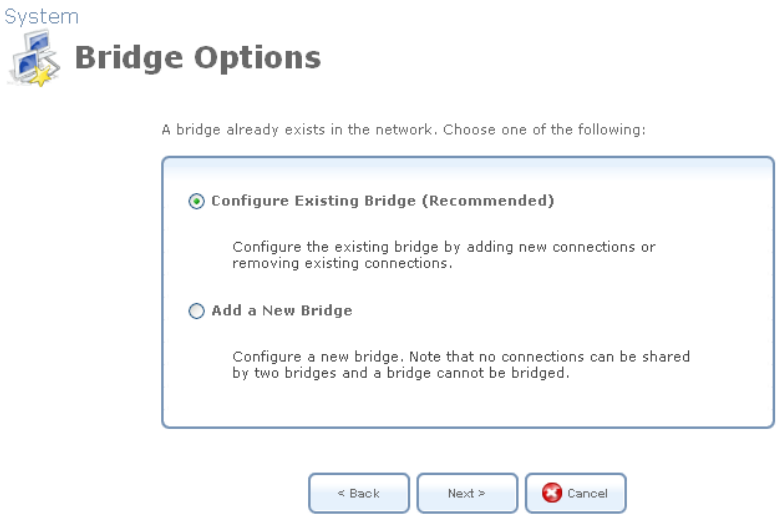

System
Bridge Options
A bridge already exists in the network. Choose one of the following:
Configure Existing Bridge (Recommended)
Configure the existing bridge by adding new connections or removing existing connections.
Add a New Bridge
Configure a new bridge. Note that no connections can be shared by two bridges and a bridge cannot be bridged.
< Back
Next >
Cancel

Figure 8.25. Bridge Options

2. Select whether to configure an existing bridge (this option will only appear if a bridge exists) or to add a new one:

    1. Configure Existing Bridge Select this option and click Next. The 'Network Bridging' screen will appear (see figure 'Network Bridging -- Configure Existing Bridge') allowing you to add new connections or remove existing ones, by checking or unchecking their respective check boxes. For example, check the WAN check box to create a LAN-WAN bridge.

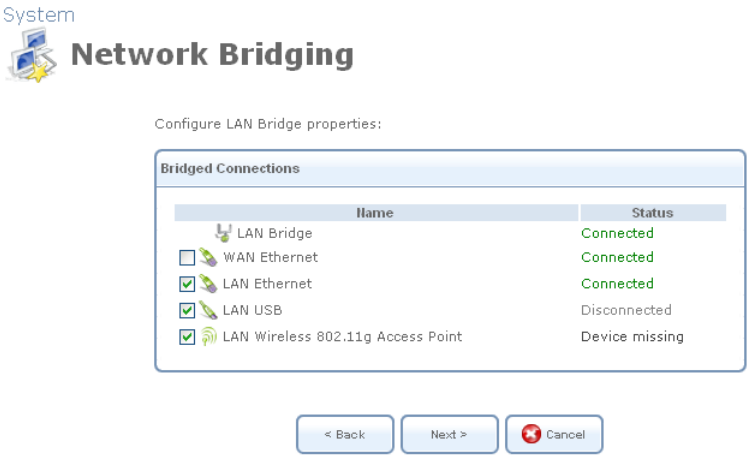


Figure 8.26. Network Bridging -- Configure Existing Bridge

2. Add a New Bridge Select this option and click Next. A different 'Network Bridging' screen will appear (see figure 'Network Bridging -- Add a New Bridge') allowing you to add a bridge over the unbridged connections, by checking their respective check boxes.

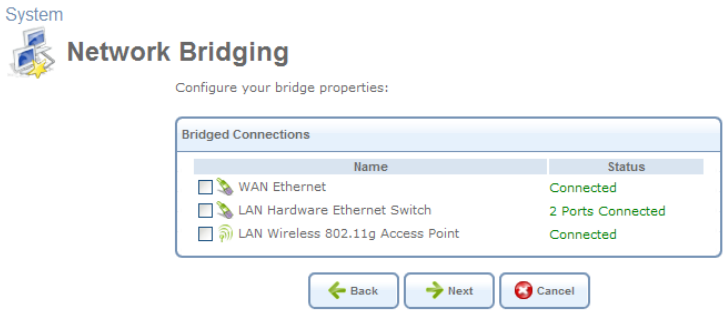


Figure 8.27. Network Bridging -- Add a New Bridge

Important notes:

- The same connections cannot be shared by two bridges.
- A bridge cannot be bridged.
- Bridged connections will lose their IP settings.

3. Click Next. The 'Connection Summary' screen will appear (see figure 'Connection Summary - Configure Existing Bridge'), corresponding to your changes.

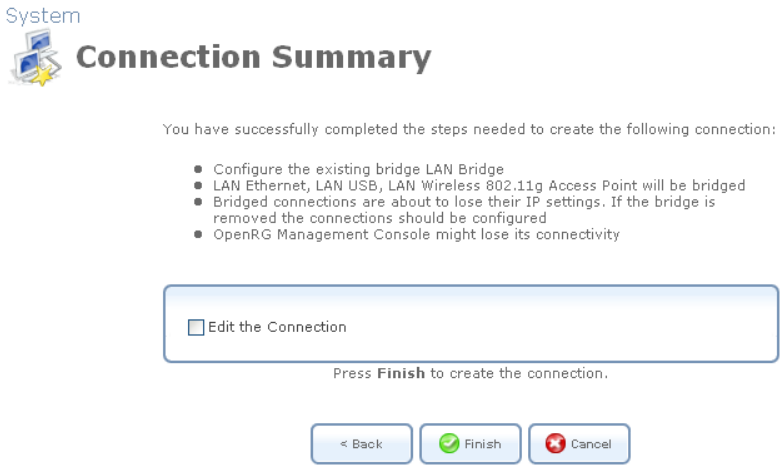

System
Connection Summary
You have successfully completed the steps needed to create the following connection:
Configure the existing bridge LAN Bridge
LAN Ethernet, LAN USB, LAN Wireless 802.11g Access Point will be bridged
Bridged connections are about to lose their IP settings. If the bridge is removed the connections should be configured
OpenRG Management Console might lose its connectivity
Edit the Connection
Press Finish to create the connection.
< Back
Finish
Cancel

Figure 8.28. Connection Summary - Configure Existing Bridge

4. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

5. Click Finish to save the settings.

The new bridge will be added to the network connections list, and will be configurable like any other bridge.

8.4.3.2. General

To view and edit the LAN bridge connection settings, click the 'LAN Bridge' link in the 'Network Connections' screen (see figure Figure 8.10). The 'LAN Bridge Properties' screen will appear (see figure Figure 8.29), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

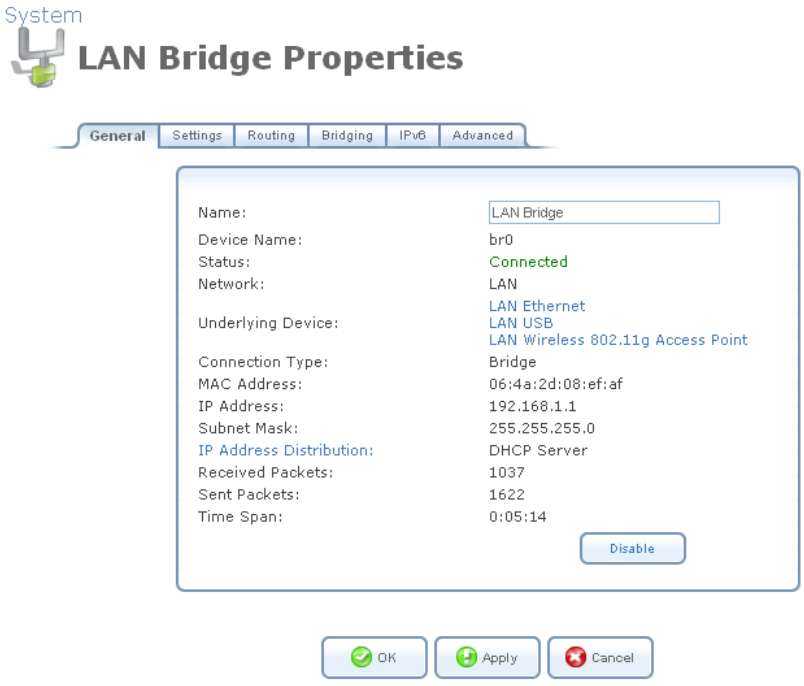


Figure 8.29. LAN Bridge Properties

8.4.3.3. Settings

General This section displays the connection's general parameters. It is recommended not to change the default values unless familiar with the networking concepts they represent. Since your gateway is configured to operate with the default values, no parameter modification is necessary.

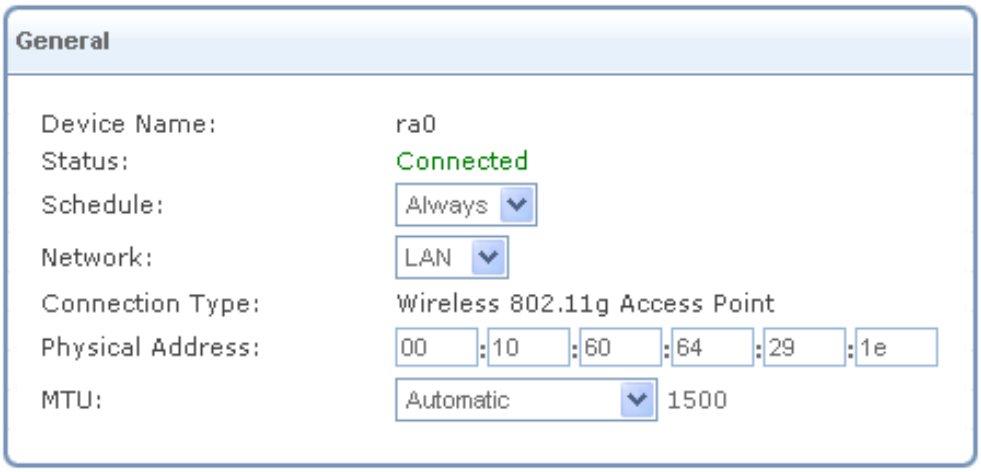


Figure 8.30. General

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

Physical Address The physical address of the network card used for your network. Some cards allow you to change this address.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

Internet Protocol Select one of the following Internet protocol options from the 'Internet Protocol' combo-box:

- No IP Address
- Obtain an IP Address Automatically
- Use the Following IP Address

Please note that the screen will refresh to display relevant configuration settings according to your choice.

No IP Address Select 'No IP Address' if you require that your gateway have no IP address. This can be useful if you are working in an environment where you are not connected to other networks, such as the Internet.

Figure 8.31. Internet Protocol -- No IP Address

Obtain an IP Address Automatically Your connection is configured by default to act as a DHCP client. You should keep this configuration in case your service provider supports DHCP, or if you are connecting using a dynamic IP address. The server that assigns the gateway with an IP address, also assigns a subnet mask. You can override the dynamically assigned subnet mask by selecting the 'Override Subnet Mask' and specifying your own

mask instead. You can press the 'Release' button to release the current leased IP address. Once the address has been released, the button text changes to 'Renew'. Use the 'Renew' button to renew the leased IP address.

Figure 8.32. Internet Protocol Settings -- Automatic IP

Use the Following IP Address Your connection can be configured using a permanent (static) IP address. Your service provider should provide you with such an IP address and subnet mask.

Figure 8.33. Internet Protocol -- Static IP

DNS Server Domain Name System (DNS) is the method by which Web site domain names are translated into IP addresses. You can configure the connection to automatically obtain a DNS server address, or specify such an address manually, according to the information provided by your ISP. To configure the connection to automatically obtain a DNS server address, select 'Obtain DNS Server Address Automatically' from the 'DNS Server' drop down menu.

Figure 8.34. DNS Server -- Automatic IP

To manually configure DNS server addresses, select 'Use the Following DNS Server Addresses' from the 'DNS Server' drop down menu (see figure 'DNS Server -- Static IP'). Specify up to two different DNS server address, one primary, another secondary.

Figure 8.35. DNS Server -- Static IP

To learn more about this feature, turn to chapter Section 7.13.1 .

IP Address Distribution The 'IP Address Distribution' section allows you to configure the gateway's Dynamic Host Configuration Protocol (DHCP) server parameters. The DHCP automatically assigns IP addresses to network PCs. If you enable this feature, make sure that you also configure your network PCs as DHCP clients. For a comprehensive description of this feature, please refer to section Section 7.13.2 . Select one of the following options from the 'IP Address Distribution' combo-box:

- DHCP Server

1. **Start IP Address** The first IP address that may be assigned to a LAN host. Since the gateway's default IP address is 192.168.1.1, this address must be 192.168.1.2 or greater.

   End IP Address The last IP address in the range that can be used to automatically assign IP addresses to LAN hosts.

   Subnet Mask A mask used to determine to what subnet an IP address belongs. An example of a subnet mask value is 255.255.0.0.

Lease Time In Minutes Each device will be assigned an IP address by the DHCP server for a this amount of time, when it connects to the network. When the lease expires the server will determine if the computer has disconnected from the network. If it has, the server may reassign this IP address to a newly-connected computer. This feature ensures that IP addresses that are not in use will become available for other computers on the network.

Provide Host Name If Not Specified by Client If the DHCP client does not have a host name, the gateway will automatically assign one for him.

2. Click 'OK' to save the settings.

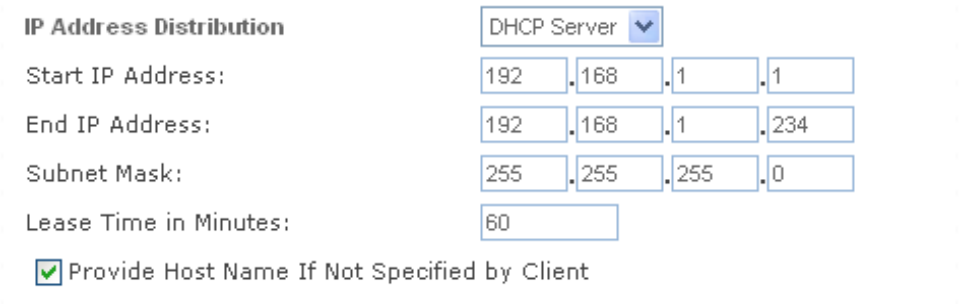
- 
IP Address Distribution
DHCP Server
Start IP Address:
192 . 168 . 1 . 1
End IP Address:
192 . 168 . 1 . 234
Subnet Mask:
255 . 255 . 255 . 0
Lease Time in Minutes:
60
Provide Host Name If Not Specified by Client

Figure 8.36. IP Address Distribution -- DHCP Server

- DHCP Relay Your gateway can act as a DHCP relay in case you would like to dynamically assign IP addresses from a DHCP server other than your gateway's DHCP server. Note that when selecting this option you must also change OpenRG's WAN to work in routing mode. For more information, see section Section 7.13.2.2 .

  1. After selecting 'DHCP Relay' from the drop down menu, a 'New IP Address' link will appear:

Figure 8.37. IP Address Distribution - DHCP Relay

Click the 'New IP Address' link. The 'DHCP Relay Server Address' screen will appear:

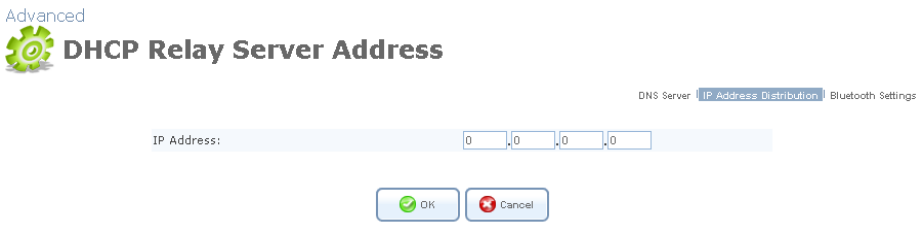


Figure 8.38. DHCP Relay Server Address

  2. Specify the IP address of the DHCP server.

  3. Click 'OK' to save the settings.

- Disabled Select 'Disabled' from the combo-box if you would like to statically assign IP addresses to your network computers.

Figure 8.39. IP Address Distribution - Disable DHCP

8.4.3.4. Routing

You can choose to setup your gateway to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Routing Mode Select one of the following routing modes:

Route Use route mode if you want your gateway to function as a router between two networks.

NAPT Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.

Device Metric The device metric is a value used by the gateway to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.

Default Route Select this check box to define this device as a the default route.

Routing Information Protocol (RIP) Select this check box to enable the Routing Information Protocol (RIP). RIP determines a route based on the smallest hop count between source and destination. When RIP is enabled, select the following:

- Listen to RIP messages - select 'None', 'RIPv1', 'RIPv2' or 'RIPv1/2'.
- Send RIP messages - select 'None', 'RIPv1', 'RIPv2-broadcast' or 'RIPv2-multicast'.

Multicast - IGMP Proxy Internal IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups. Select the 'Multicast IGMP Proxy Internal' check-box to enable this feature.

IGMP Query Version OpenRG supports all three versions of IGMP. Select the version you would like to use.

Routing Table Allows you to add or modify routes when this device is active. Use the 'New Route' button to add a route or edit existing routes.

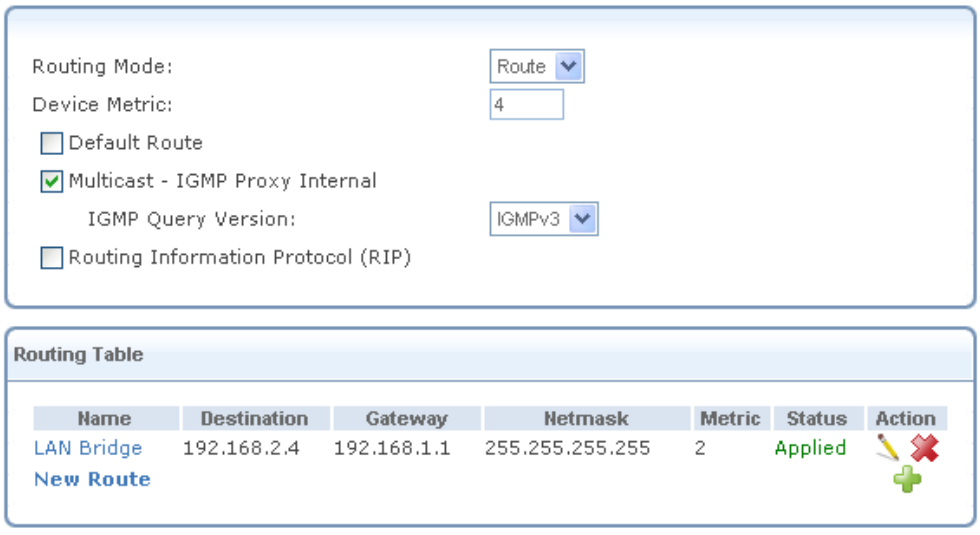


Figure 8.40. Advanced Routing Properties

To learn more about this feature, please refer to chapter Section 8.6.1 .

8.4.3.5. Bridging

This section allows you to specify the devices that you would like to join under the network bridge. Click the action icon under the 'VLANs' column to assign the network connections to specific virtual LANS. Select the 'STP' check box to enable the Spanning Tree Protocol on the device. You should use this to ensure that there are no loops in your network configuration, and apply these settings in case your network consists of multiple switches, or other bridges apart from those created by the gateway.

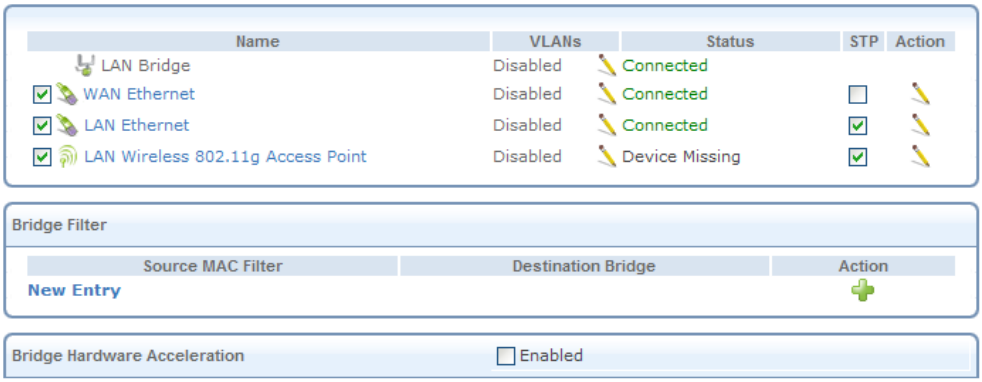


Figure 8.41. LAN Bridge Settings

Bridge Filter This section is used for creating a traffic filtering rule on the bridge, in order to enable direct packet flow between the WAN and the LAN. Such an example is when setting up a hybrid bridging mode (refer to section Section 8.4.22.2).

Bridge Hardware Acceleration Select this check box to utilize the **Fastpath** algorithm for enhancing packet flow through the bridge. Note that this feature must be supported and enabled on the bridge's underlying devices in order to work properly.

8.4.3.6. IPv6

Click on the 'New Unicast Address' link to add an IPv6 unicast address. To learn more about configuring IPv6 settings, refer to Section 8.6.2.

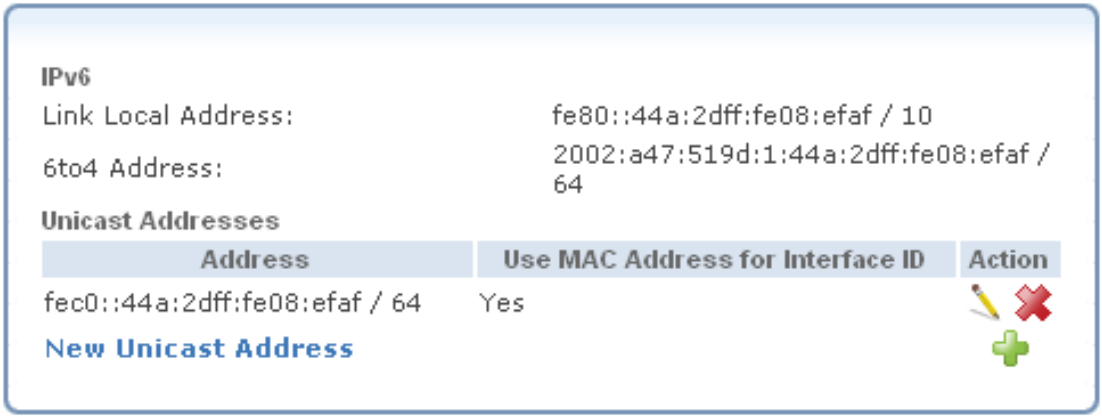


Figure 8.42. IPv6 Settings

8.4.3.7. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be

activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

Figure 8.43. Internet Connection Firewall

- **Additional IP Addresses** You can add alias names (additional IP addresses) to the gateway by clicking the 'New IP Address' link. This enables you to access the gateway using these aliases in addition to the 192.168.1.1 and the http://openrg.home.

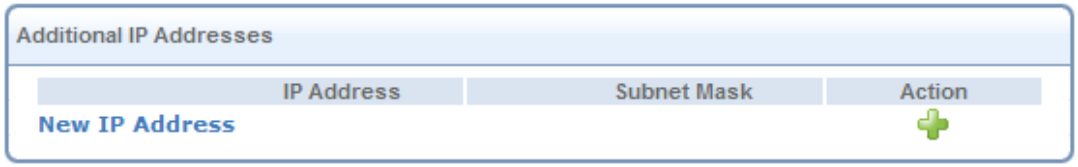


Figure 8.44. Additional IP Addresses

8.4.4. LAN Ethernet

A LAN Ethernet connection connects computers to OpenRG using Ethernet cables, either directly or via network hubs and switches.

8.4.4.1. General

To view and edit the LAN Ethernet connection settings, click the 'LAN Ethernet' link in the 'Network Connections' screen (see figure Figure 8.10). The 'LAN Ethernet Properties' screen will appear (see figure Figure 8.45), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

Figure 8.45. LAN Ethernet Properties

8.4.4.2. Settings

General This section displays the connection's general parameters. It is recommended not to change the default values unless familiar with the networking concepts they represent. Since your gateway is configured to operate with the default values, no parameter modification is necessary.

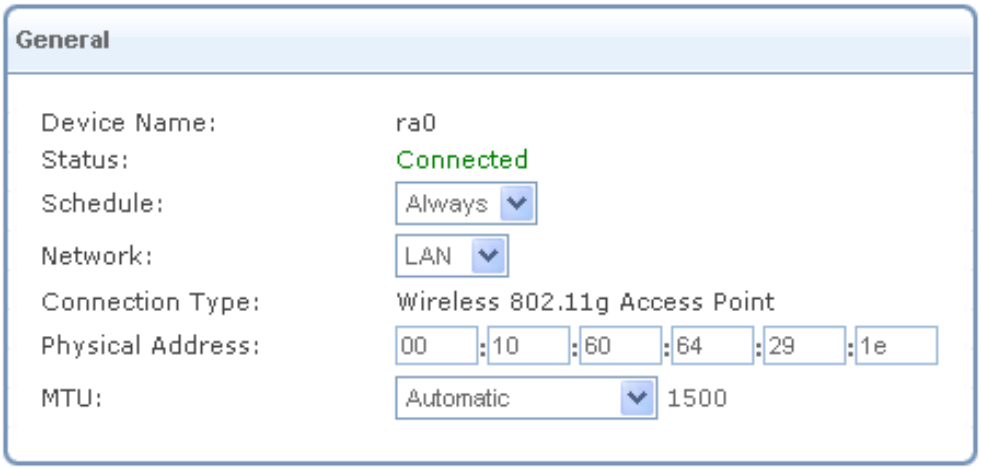


Figure 8.46. General

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

Physical Address The physical address of the network card used for your network. Some cards allow you to change this address.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

8.4.4.3. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

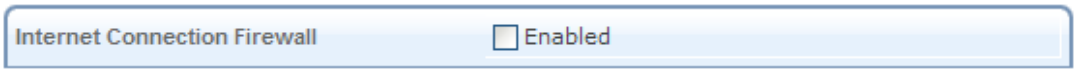


Figure 8.47. Internet Connection Firewall

Internet Connection Fastpath Select this check box to utilize the *Fastpath* algorithm for enhancing packet flow, resulting in faster communication between the LAN and the WAN. By default, this feature is enabled.

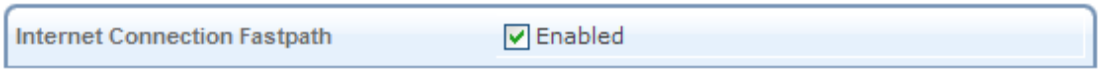


Figure 8.48. Internet Connection Fastpath

- **Additional IP Addresses** You can add alias names (additional IP addresses) to the gateway by clicking the 'New IP Address' link. This enables you to access the gateway using these aliases in addition to the 192.168.1.1 and the http://openrg.home.

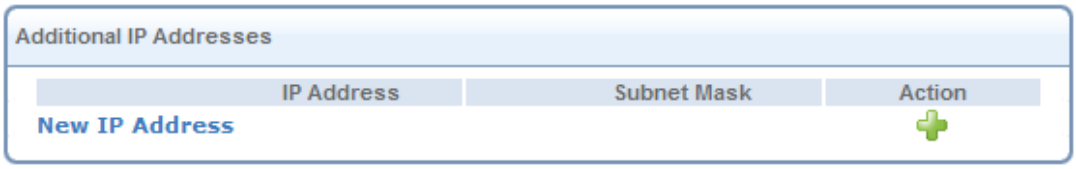


Figure 8.49. Additional IP Addresses

8.4.5. LAN USB

The LAN USB connection allows you to connect a Windows PC to OpenRG using a USB cable. Connect your gateway's USB slave port to a master port on the PC.

8.4.5.1. General

To view and edit the LAN USB connection settings, click the 'LAN USB' link in the 'Network Connections' screen (see figure Figure 8.10). The 'LAN USB Properties' screen will appear (see figure Figure 8.50), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

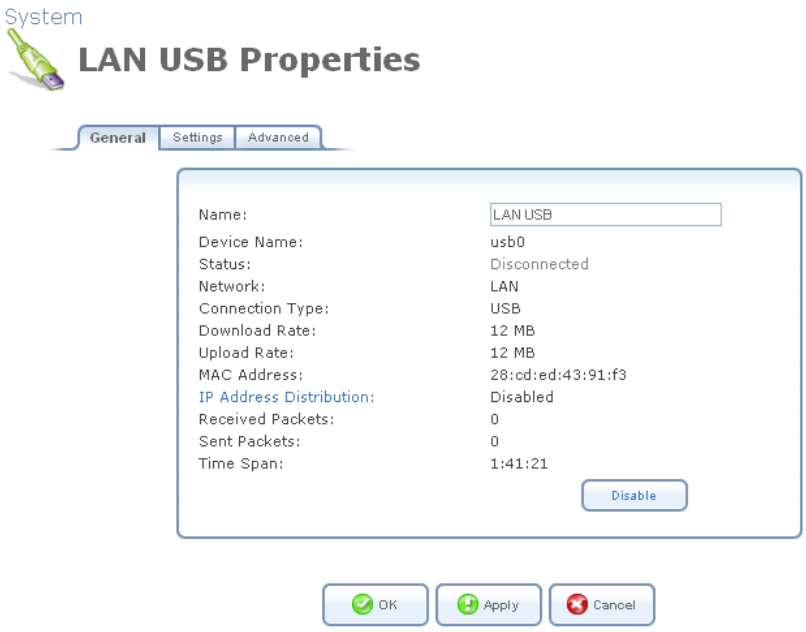


Figure 8.50. LAN USB Properties

8.4.5.2. Settings

General This section displays the connection's general parameters. It is recommended not to change the default values unless familiar with the networking concepts they represent. Since your gateway is configured to operate with the default values, no parameter modification is necessary.

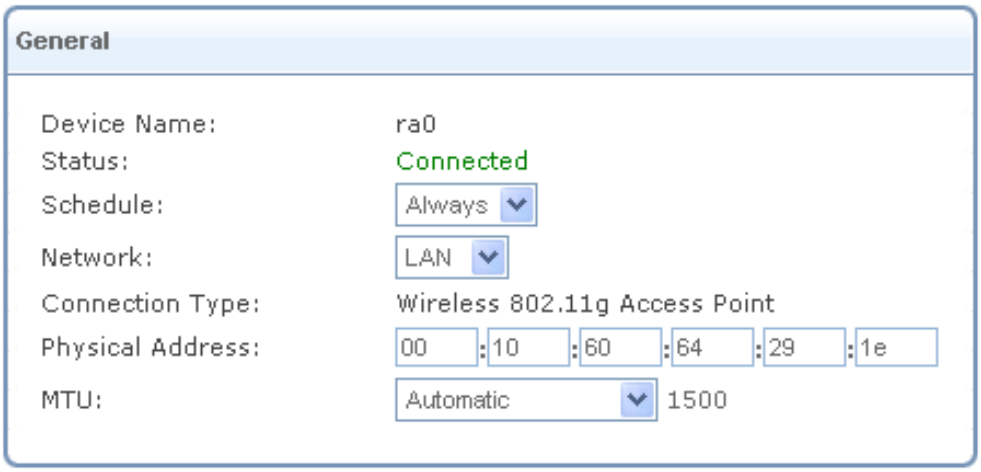


Figure 8.51. General

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

Physical Address The physical address of the network card used for your network. Some cards allow you to change this address.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

8.4.5.3. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

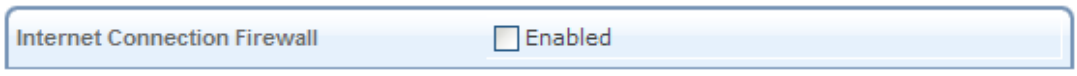


Figure 8.52. Internet Connection Firewall

- **Additional IP Addresses** You can add alias names (additional IP addresses) to the gateway by clicking the 'New IP Address' link. This enables you to access the gateway using these aliases in addition to the 192.168.1.1 and the http://openrg.home.

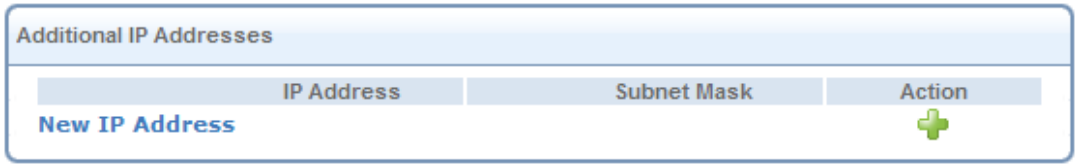


Figure 8.53. Additional IP Addresses

8.4.6. LAN Wireless

OpenRG for wireless gateways provides broadband customer premise equipment (CPE) manufacturers with a complete software solution for developing feature-rich CPE with wireless connectivity over the 802.11 **a** , **b** , **d** and **g** standards. The solution is vertically integrated and includes an operating system, communication protocols, routing, advanced wireless and broadband networking security, remote management and home networking applications. OpenRG integrates multiple layers of wireless security. These include the IEEE 802.1x port-based authentication protocol, RADIUS client, EAP-MD5, EAP-TLS, EAP-TTLS, EAP-PEAP, Wi-Fi Protected Access (WPA), WPA2, WPA and WPA2 (mixed mode) and industry leading OpenRG Firewall and VPN applications. In addition, OpenRG's built-in authentication server enables home/SOHO users to define authorized wireless users without the need for an external RADIUS server.

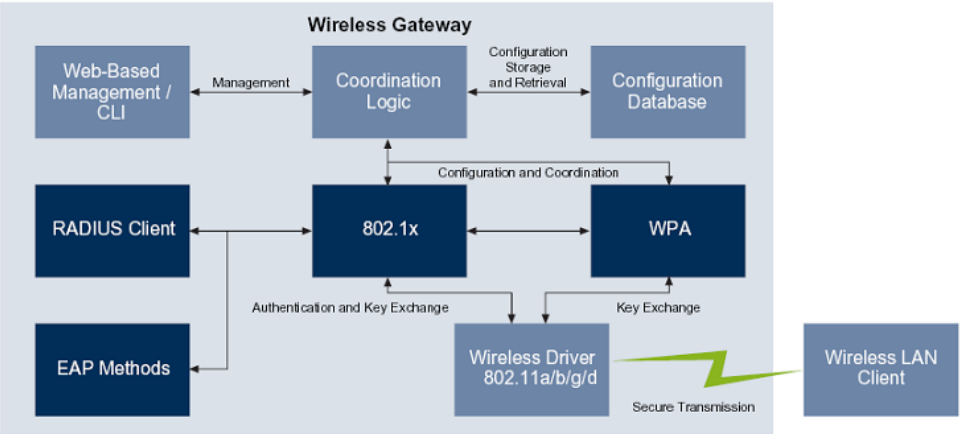


Figure 8.54. OpenRG for Wireless Gateways Authentication and Encryption Components

This section begins with basic instructions to quickly and easily configure your network, and continues with advanced settings options.

8.4.6.1. Supported Wireless Extension Cards

OpenRG currently supports the following wireless extension cards:

- Airgo AGN-100
- Ralink RT-2560
- Ralink RT-2561
- Ralink RT-2661

OpenRG installed on the Freescale MPC8349ITX platform supports the following Atheros wireless cards:

- Atheros AR2413
- Atheros AR5413

In addition, OpenRG supports Broadcom's built-in wireless chipset on the following platforms:

- Broadcom BCM96358
- ASUS 6020VI

Note that not all of the wireless features depicted in this section may be available with your version. OpenRG incorporates a wireless card auto-detection mechanism. When booting, OpenRG checks whether a wireless

extension card is available. If so, it verifies the make and model of the card and only loads its supported wireless features. OpenRG will display a "Wireless" section in the 'Quick Setup' management screen. If your gateway includes a supported wireless module, yet you do not see this section, you will need to load a firmware version with wireless support in order to perform this evaluation. Check for availability at: http://www.jungo.com/openrg/wizard/wizard.html

8.4.6.2. Configuring Your Wireless Network

This section will familiarize you with OpenRG's wireless configuration, and demonstrate how to connect a wireless PC to the network.

Note: Connect the defined wireless card to your development board before booting. Booting without the wireless card may cause the image to halt.

8.4.6.2.1. Configuring OpenRG's Wireless Connection

1. Click the 'LAN Wireless 802.11g Access Point' link in the 'Network Connections' screen (see figure Figure 8.10). The 'LAN Wireless 802.11g Access Point Properties' screen appears:

Figure 8.55. LAN Wireless 802.11g Access Point Properties -- Disabled

2. Press the 'Enable' button to activate the wireless connection (this button is displayed only if a wireless card is available on the gateway). The screen will refresh, and the connection status will change to "Connected".

3. Click the 'Wireless' tab.

4. In the 'SSID' field, change the broadcasted name of your wireless network from the default "openrg" to a more unique name:

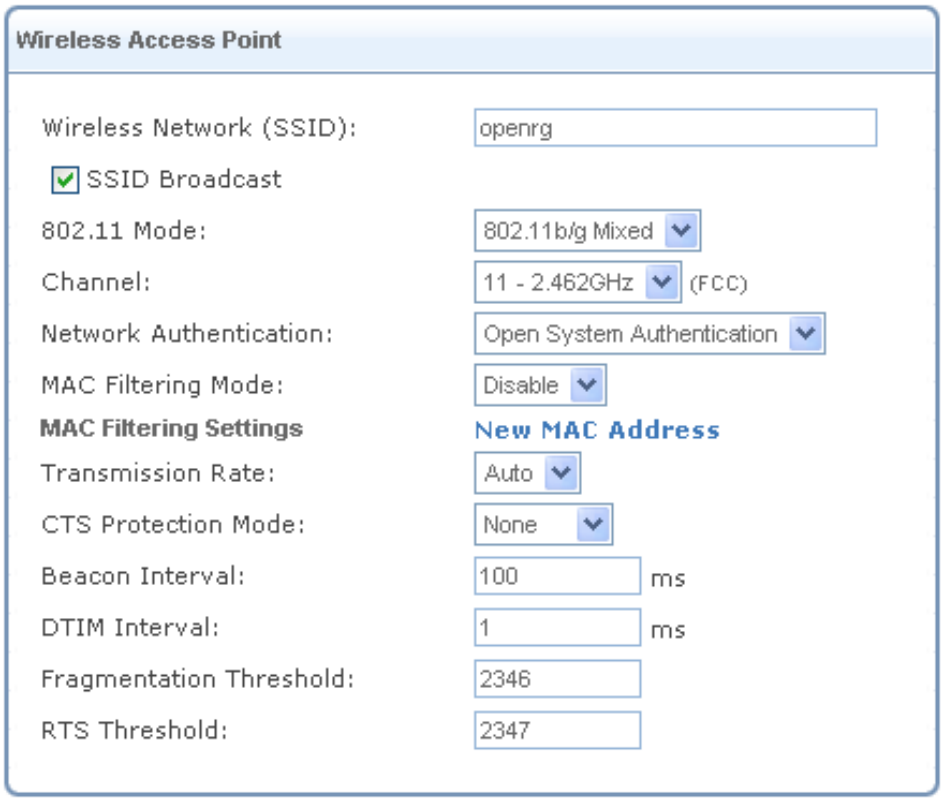


Figure 8.56. Wireless Access Point

5. Click 'OK' to save the settings.

A comprehensive description of all of the wireless connection settings in the screen above is described later in this chapter.

8.4.6.2.2. Configuring a Wireless Windows XP Client

If your PC has wireless capabilities, Windows XP will automatically recognize this and create a wireless connection for you. You can view this connection under Window's Network Connections.

Note: The following description and images are in accordance with Microsoft Windows XP, Version 2002, running Service Pack 2.

1. Open your Network Connections window from Window's Control Panel. The 'Network Connections' screen appears.

Figure 8.57. Network Connections

2. Double-click the wireless connection icon. The 'Wireless Network Connection' screen will appear, displaying all available wireless networks in your vicinity. If your gateway is connected and active, you will see OpenRG's wireless connection (see figure Figure 8.58). Note that the connection's status is 'Not connected' and defined as "Unsecured wireless network".

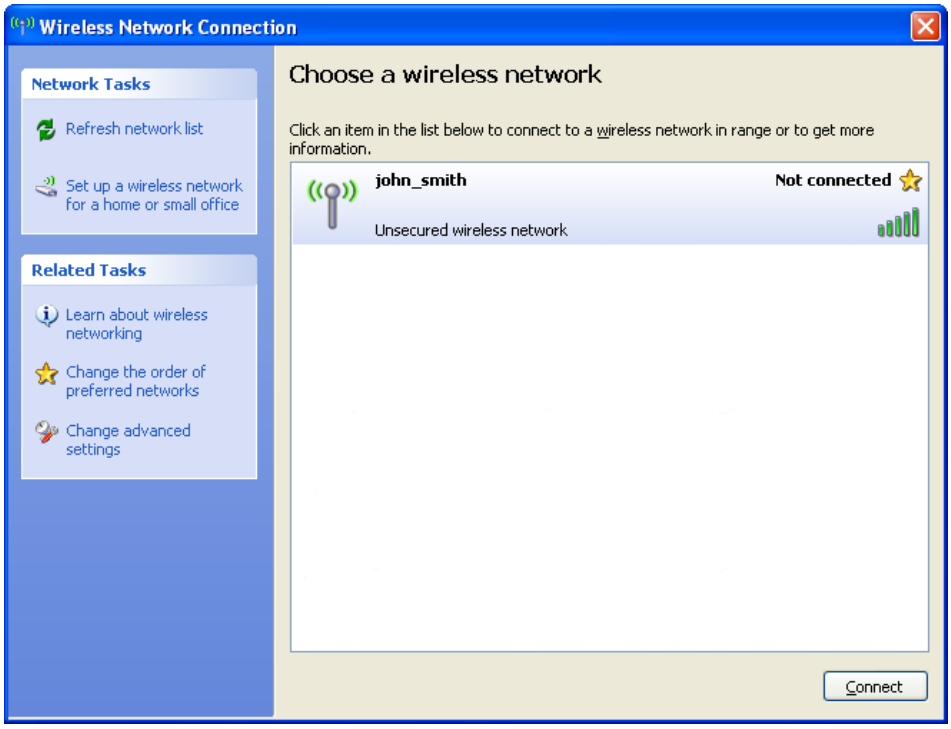

Wireless Network Connection
Network Tasks
Refresh network list
Set up a wireless network for a home or small office
Related Tasks
Learn about wireless networking
Change the order of preferred networks
Change advanced settings
Choose a wireless network
Click an item in the list below to connect to a wireless network in range or to get more information.
john_smith
Not connected
Unsecured wireless network
Connect

Figure 8.58. Available Wireless Connections

3. Click the connection once to mark it and then press the 'Connect' button at the bottom of the screen. After the connection is established, its status will change to 'Connected':

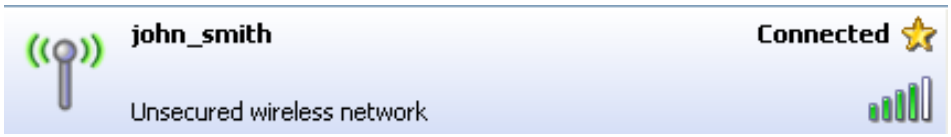


Figure 8.59. Connected Wireless Network

An icon will appear in the notification area, announcing the successful initiation of the wireless connection.

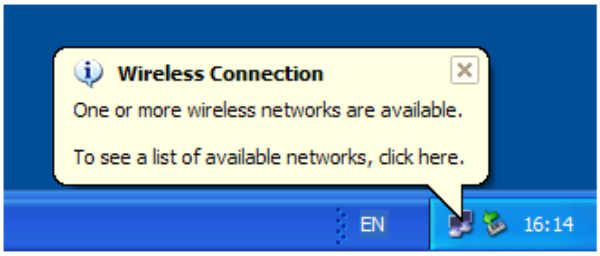


Figure 8.60. Wireless Connection Information

4. Test the connection by disabling all other connections in the 'Network Connections' screen (see figure Figure 8.57) and by browsing the Internet.

You can now use OpenRG's wireless network from the configured PC. Currently only HTTP authentication protects the wireless network from unauthorized users. Consider securing the wireless network using other methods as described in section Section 8.4.6.5.

8.4.6.3. Web Authentication

Once OpenRG is running, prior to wireless authentication and encryption, the Web authentication feature protects your wireless network from unauthorized wireless clients. When wireless clients attempt to connect to OpenRG's WAN, they are prompted to enter a user name and password (see figure Figure 8.61). Note that all other attempts to use the wireless network prior to the authentication will fail (Telnet, FTP, ping).

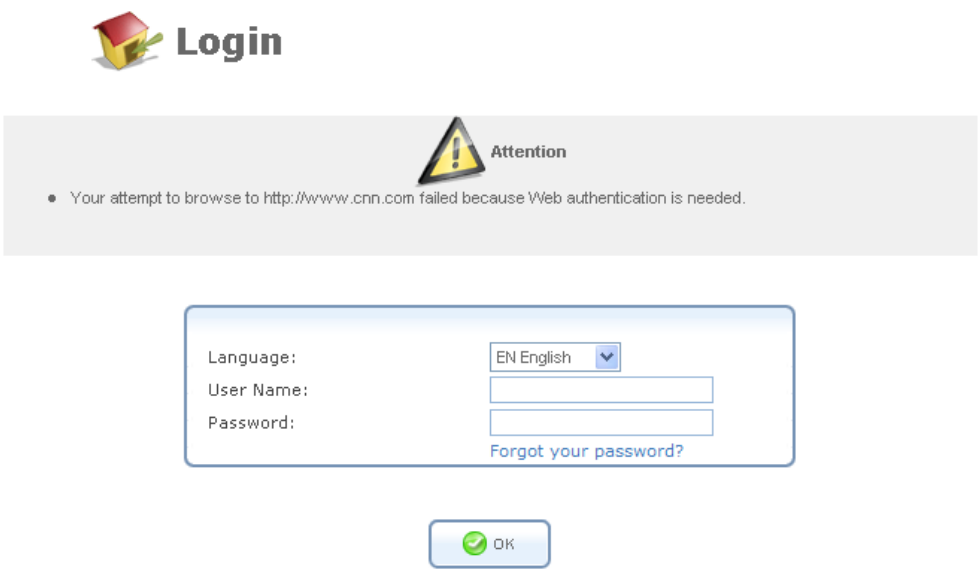


Figure 8.61. Web Authentication

Enter your user name and password and click 'OK'. Once authentication has been performed, you may proceed to use OpenRG's wireless network from the configured PC.

Figure 8.62. Web Authentication

Note: Web authentication is available only after you first perform an initial configuration using the 'Quick Setup' screen and have an active WAN connection.

8.4.6.4. Forgotten Password

8.4.6.4.1. Forgotten Password for Wireless Network

When attempting to connect to OpenRG as a wireless client, you are prompted to enter a username and password. In case you have forgotten your password, use the 'Forgot Your Password?' link that appears in the login screen.

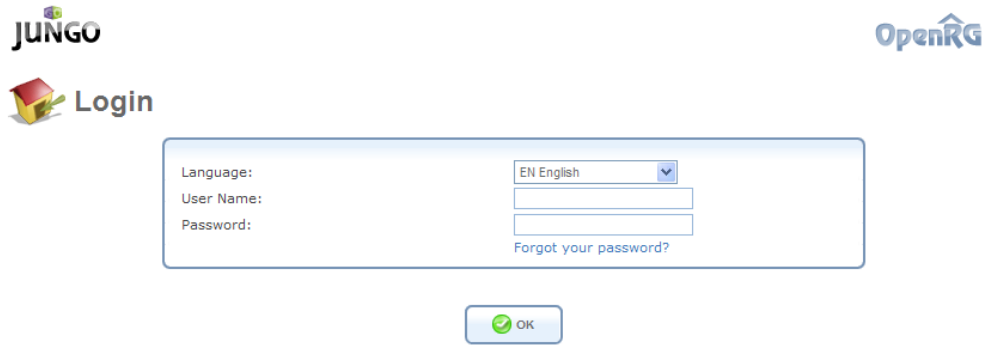


Figure 8.63. Wireless Login

The 'Forgotten Password for Wireless Network' screen appears, providing numerous possible courses of action aimed at helping you login.

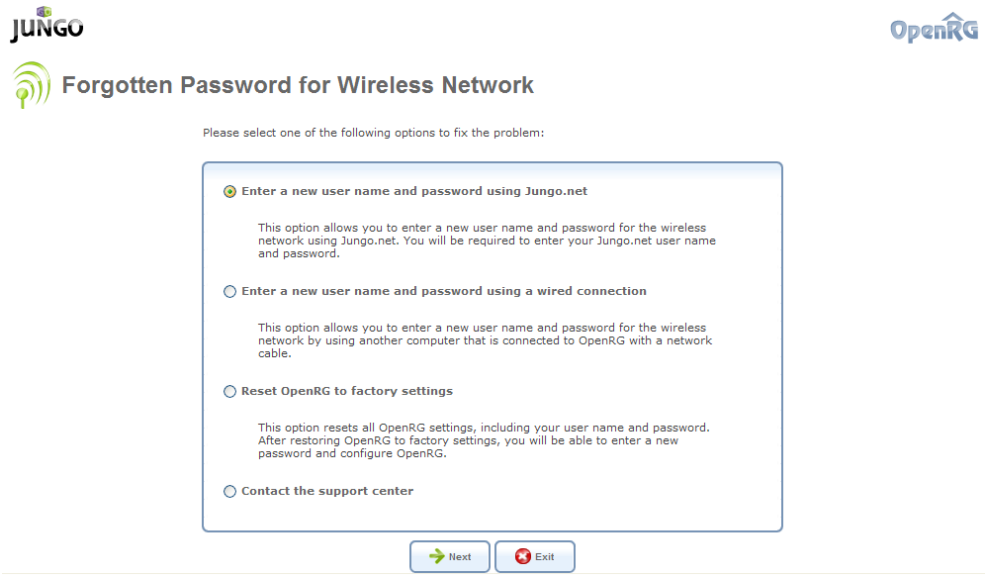

JUNGO
OpenRG
Forgotten Password for Wireless Network
Please select one of the following options to fix the problem:
Enter a new user name and password using Jungo.net
This option allows you to enter a new user name and password for the wireless network using Jungo.net. You will be required to enter your Jungo.net user name and password.
Enter a new user name and password using a wired connection
This option allows you to enter a new user name and password for the wireless network by using another computer that is connected to OpenRG with a network cable.
Reset OpenRG to factory settings
This option resets all OpenRG settings, including your user name and password. After restoring OpenRG to factory settings, you will be able to enter a new password and configure OpenRG.
Contact the support center
Next
Exit

Figure 8.64. Forgotten Password for Wireless Network

- **Enter a new user name and password using Jungo.net** This option appears only when OpenRG is connected to Jungo.net. It enables you to enter a new user name and password for the wireless network using Jungo.net.

  1. To use this option, select its radio button and click 'Next'. The Jungo.net login screen appears.

Figure 8.65. Jungo.net Login

  2. Enter OpenRG's Jungo.net user name and password, and click 'OK'. The 'Wireless LAN User' screen appears.

Figure 8.66. Wireless LAN User

3. Create a new wireless client by entering a user name and password, and click 'Go'. The screen refreshes as the user is created, until the 'New User Created' screen appears.

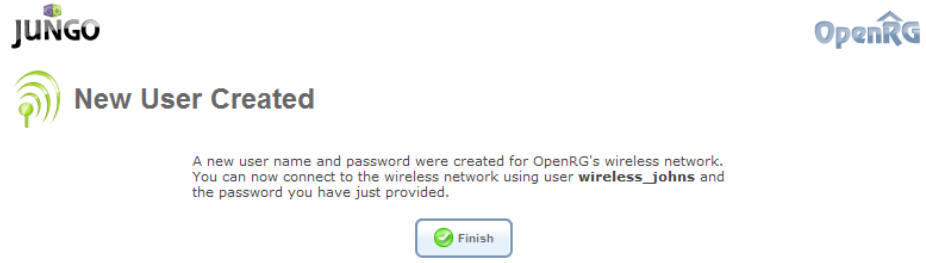

JUNGO
OpenRG
New User Created
A new user name and password were created for OpenRG's wireless network.
You can now connect to the wireless network using user wireless_johns and the password you have just provided.
Finish

Figure 8.67. New User Created

4. Click 'Finish'. OpenRG's login screen appears. You can now login with the new wireless client details.

- **Enter a new user name and password using a wired connection** This option allows you to enter a new user name and password for the wireless network by using another computer that is physically connected to OpenRG. To use this option, select its radio button and click 'Next'. The next screen contains a detailed description of the steps you must follow in order to create a new user name and password for the wireless network.

JUNGO
OpenRG
Enter a New User Name and Password Using a Wired Connection
To add a new user name and password:
1. Go to a computer that is connected to OpenRG using a network cable.
2. Open a web browser.
3. In the address bar, type http://openrg.home.
4. Click Forgot your wireless network password?.
Back
Exit

Figure 8.68. Enter a New User Name and Password Using a Wired Connection

- **Reset OpenRG to factory settings** This option resets OpenRG's settings, including your user name and password. To use this option, select its radio button and click 'Next'. The next screen contains a detailed description of the steps you must follow in order to reset OpenRG to its factory settings.

JUNGO
OpenRG
Reset Factory Settings
To reset OpenRG to factory settings:
1. Push and hold the reset button for 5 seconds.
2. OpenRG will restore to factory settings and reboot.
3. After reboot is complete, OpenRG's network name (SSID) will change to openrg, set your computer to connect to this network.
4. Type http://openrg.home in the web browser address bar.
5. Follow the Installation Wizard.
Back
Exit

Figure 8.69. Reset Factory Settings

- **Contact the support center** If all previous methods have not been helpful, select this radio button and click 'Next'. The next screen contains instructions to call the support center, and displays your gateway's identification required when opening a support call.

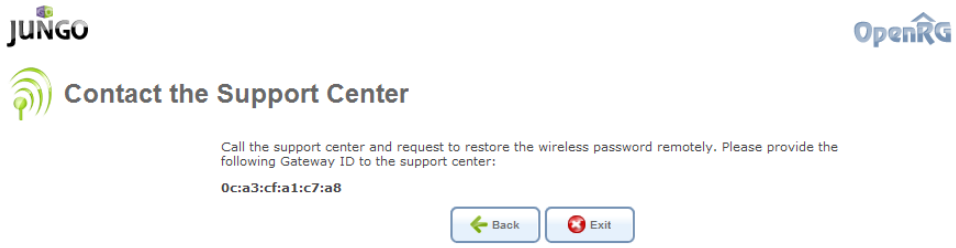

JUNGO
OpenRG
Contact the Support Center
Call the support center and request to restore the wireless password remotely. Please provide the following Gateway ID to the support center:
0c:a3:cf:a1:c7:a8
Back
Exit

Figure 8.70. Contact the Support Center

8.4.6.5. Securing Your Wireless Network

OpenRG's wireless network is ready for operation with its default values. The following section describes how to secure your wireless connection using the **Wi-Fi Protected Access** (WPA) security protocol. The Wi-Fi Alliance created the WPA security protocol as a data encryption method for 802.11 wireless local area networks (WLANs). WPA is an industry-supported, pre-standard version of 802.11i utilizing the Temporal Key Integrity Protocol (TKIP), which fixes the problems of Wired Equivalent Privacy (WEP), including the use of dynamic keys.

8.4.6.5.1. Securing Your Wireless Network with WPA

1. Click the 'LAN Wireless 802.11g Access Point' link in the 'Network Connections' screen. The 'LAN Wireless 802.11g Access Point Properties' screen appears:

Figure 8.71. LAN Wireless 802.11g Access Point Properties -- Enabled

2. Click the 'Wireless' tab.

3. Enable the 'Wireless Security' feature by checking its 'Enabled' check box. The screen will refresh, displaying the wireless security options (see figure Figure 8.72).

4. Select "WPA" as the stations security type.

5. Verify that the authentication method selected is "Pre-Shared Key".

6. Enter a phrase of at least 8 characters in the 'Pre-Shared Key' text field. Verify that "ASCII" is selected in the associated combo box.

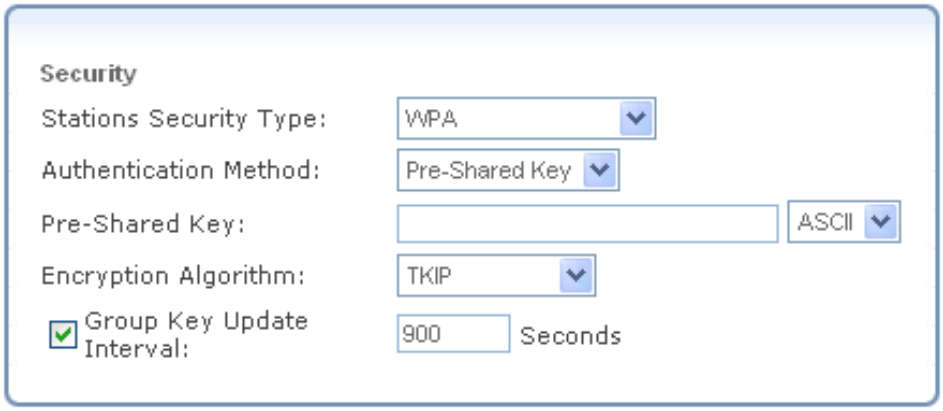


Figure 8.72. WPA Wireless Security Parameters

7. Click 'OK'. The following 'Attention' screen will appear warning you that OpenRG might require reloading.

Figure 8.73. Browser Reload Warning

8. Click 'OK' to save the settings.

8.4.6.5.2. Connecting a Wireless Windows XP Client to the Secured Wireless Network

1. Open your Network Connections window from Window's Control Panel. The 'Network Connections' screen appears.

Figure 8.74. Network Connections

2. Double-click the wireless connection icon. The 'Wireless Network Connection' screen will appear, displaying OpenRG's wireless connection (see figure Figure 8.75). Note that the connection is defined as "Security-enabled wireless network (WPA)".

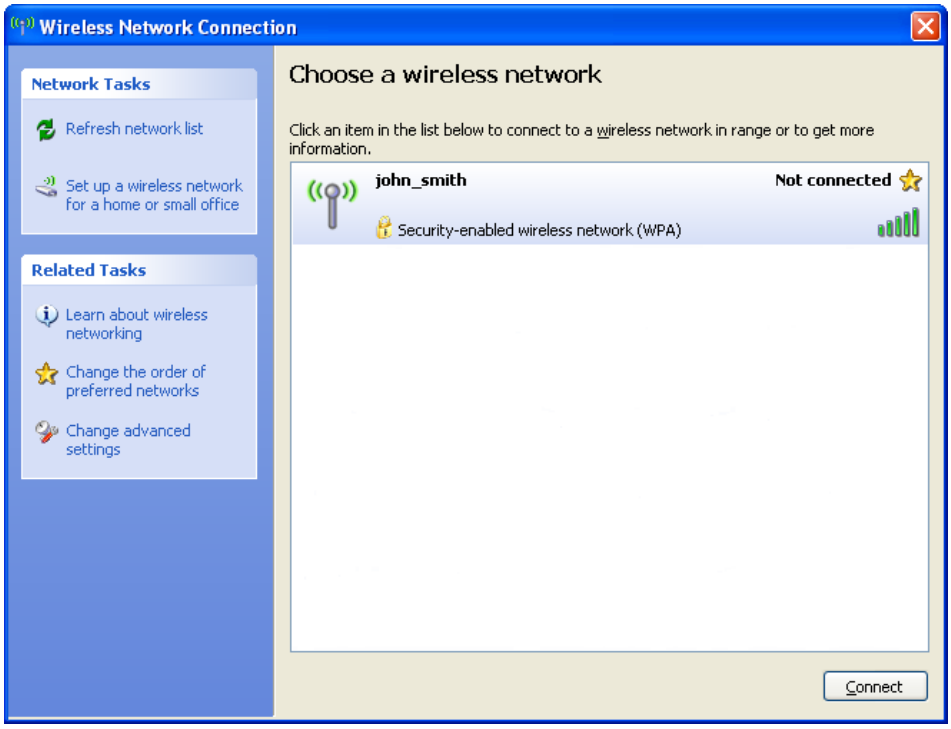

Wireless Network Connection
Network Tasks
Refresh network list
Set up a wireless network for a home or small office
Related Tasks
Learn about wireless networking
Change the order of preferred networks
Change advanced settings
Choose a wireless network
Click an item in the list below to connect to a wireless network in range or to get more information.
john_smith
Not connected
Security-enabled wireless network (WPA)
Connect

Figure 8.75. Available Wireless Connections

3. Click the connection once to mark it and then press the 'Connect' button at the bottom of the screen. The following login window will appear, asking for a 'Network Key', which is the pre-shared key you have configured above.

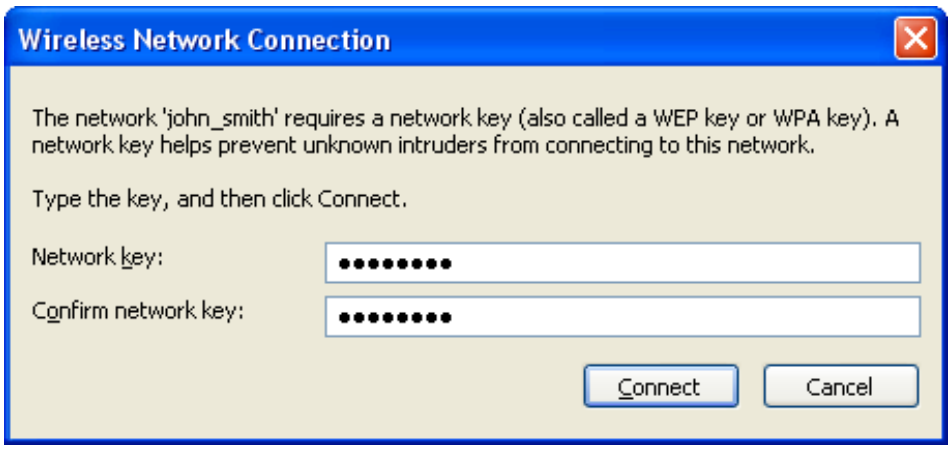

Wireless Network Connection
The network 'john_smith' requires a network key (also called a WEP key or WPA key). A network key helps prevent unknown intruders from connecting to this network.
Type the key, and then click Connect.
Network key:
Confirm network key:
Connect
Cancel

Figure 8.76. Wireless Network Connection Login

4. Enter the pre-shared key in both fields and press the 'Connect' button. After the connection is established, its status will change to 'Connected':

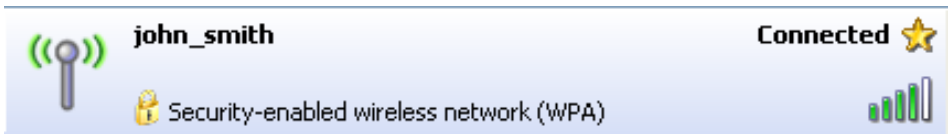


Figure 8.77. Connected Wireless Network

An icon will appear in the notification area, announcing the successful initiation of the wireless connection.

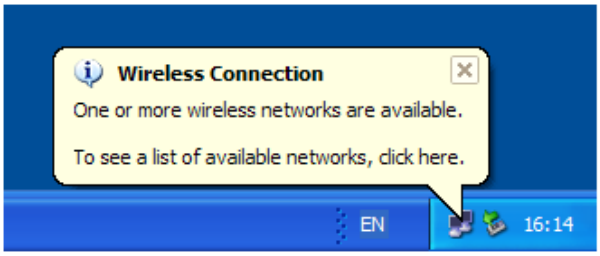


Figure 8.78. Wireless Connection Information

5. Test the connection by disabling all other connections in the 'Network Connections' screen (see figure Figure 8.74) and by browsing the Internet.

Should the login window above not appear and the connection attempt fail, please configure Window's connection manually:

1. Click the connection once to mark it and then click the 'Change advanced settings' link in the 'Related Tasks' box on the left part of the window (see figure Figure 8.79).

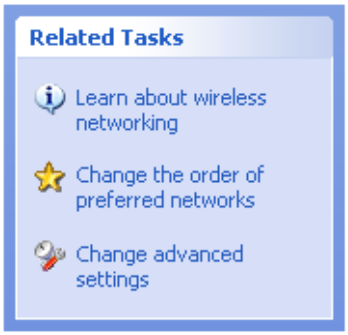


Figure 8.79. Related Tasks

2. The 'Wireless Network Connection Properties' window will appear. Select the 'Wireless Networks' tab (see figure Figure 8.80).

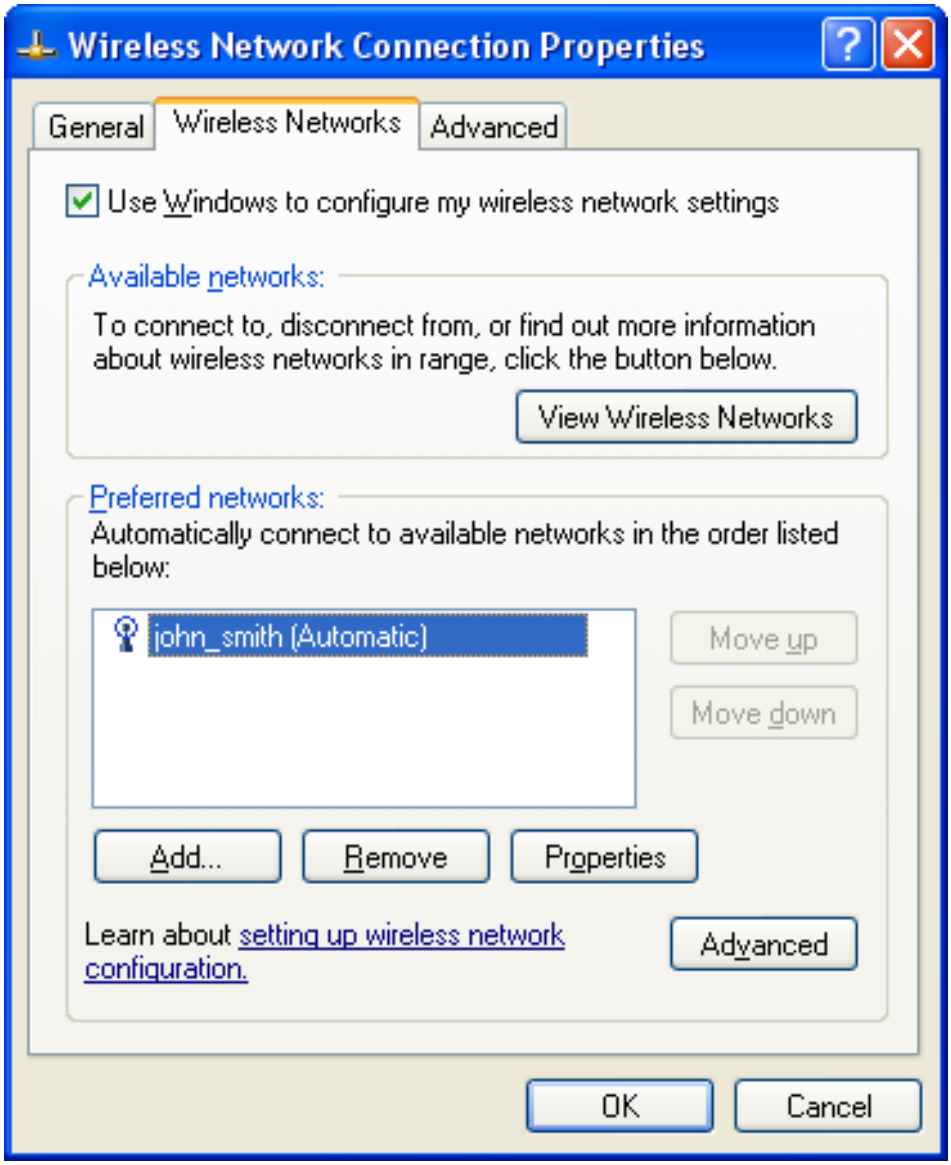


Figure 8.80. Wireless Network Connection Properties

3. Click your connection to highlight it and press the 'Properties' button. Your connection's properties window will appear (see figure Figure 8.81).

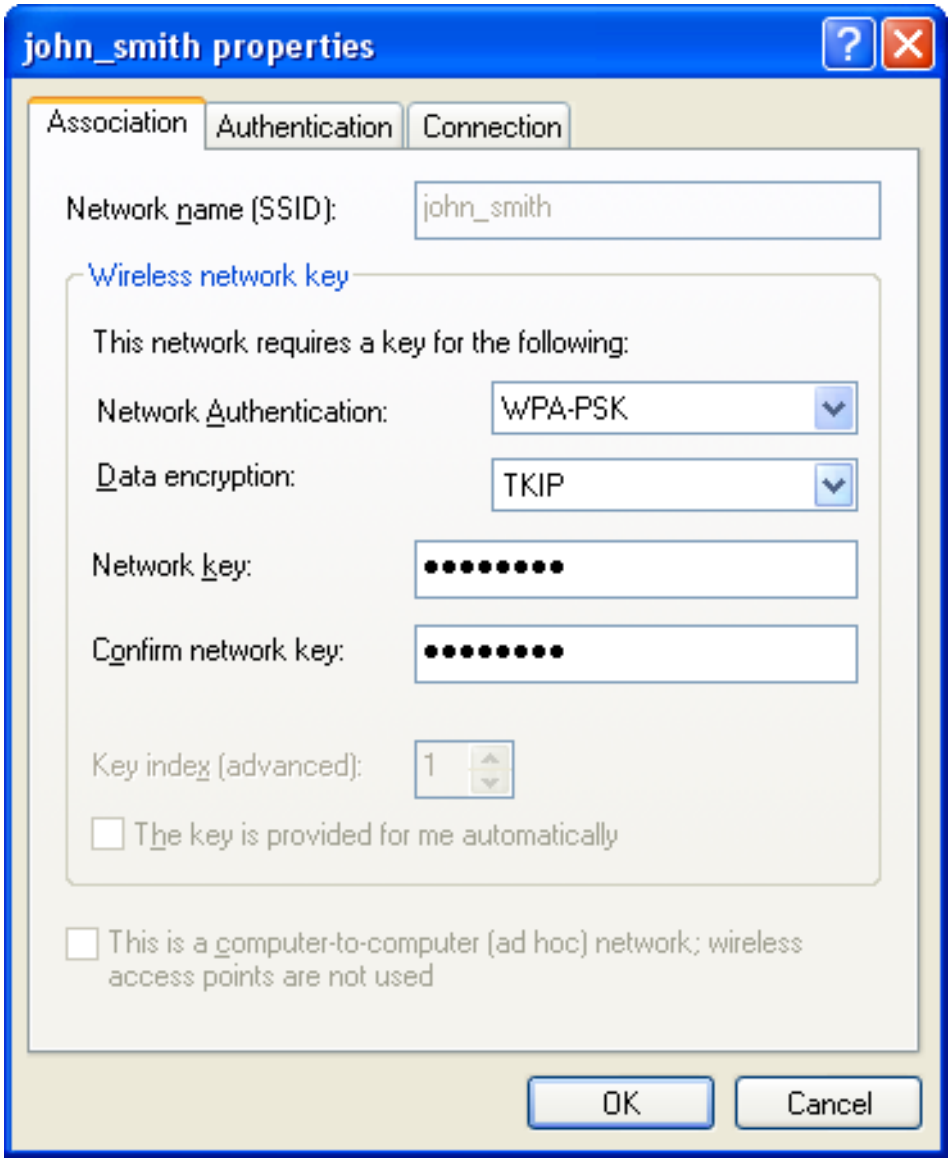


Figure 8.81. Connection Properties Configuration

- In the 'Network Authentication' combo box, select "WPA-PSK".
- In the 'Data Encryption' combo box, select "TKIP".
- Enter your pre-shared key in both the 'Network key' and the 'Confirm network key' fields.

4. Click 'OK' on both windows to save the settings.
5. When attempting to connect to the wireless network, the login window will now appear, pre-filled with the pre-shared key. Press the 'Connect' button to connect.

Since your network is now secured, only users that know the pre-shared key will be able to connect. The WPA security protocol is similar to securing network access using a password.

8.4.6.6. General

To view and edit the LAN Wireless connection settings, click the 'LAN Wireless 802.11g Access Point' link in the 'Network Connections' screen (see figure Figure 8.10). The 'LAN Wireless 802.11g Access Point Properties'

screen will appear (see figure Figure 8.82), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

Figure 8.82. LAN Wireless 802.11g Access Point Properties -- Enabled

8.4.6.7. Settings

General This section displays the connection's general parameters. It is recommended not to change the default values unless familiar with the networking concepts they represent. Since your gateway is configured to operate with the default values, no parameter modification is necessary.

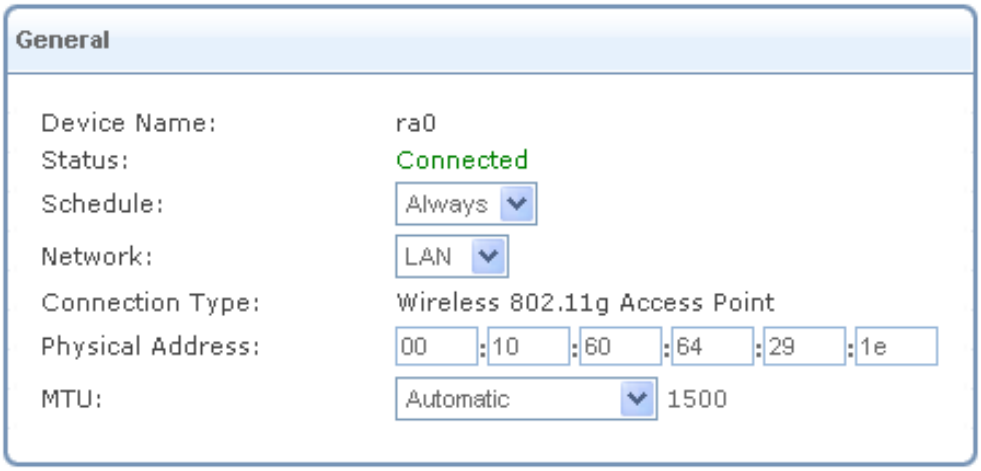


Figure 8.83. General

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

Physical Address The physical address of the network card used for your network. Some cards allow you to change this address.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

8.4.6.8. Wireless

Wireless Access Point Use this section to define the basic wireless access point settings.

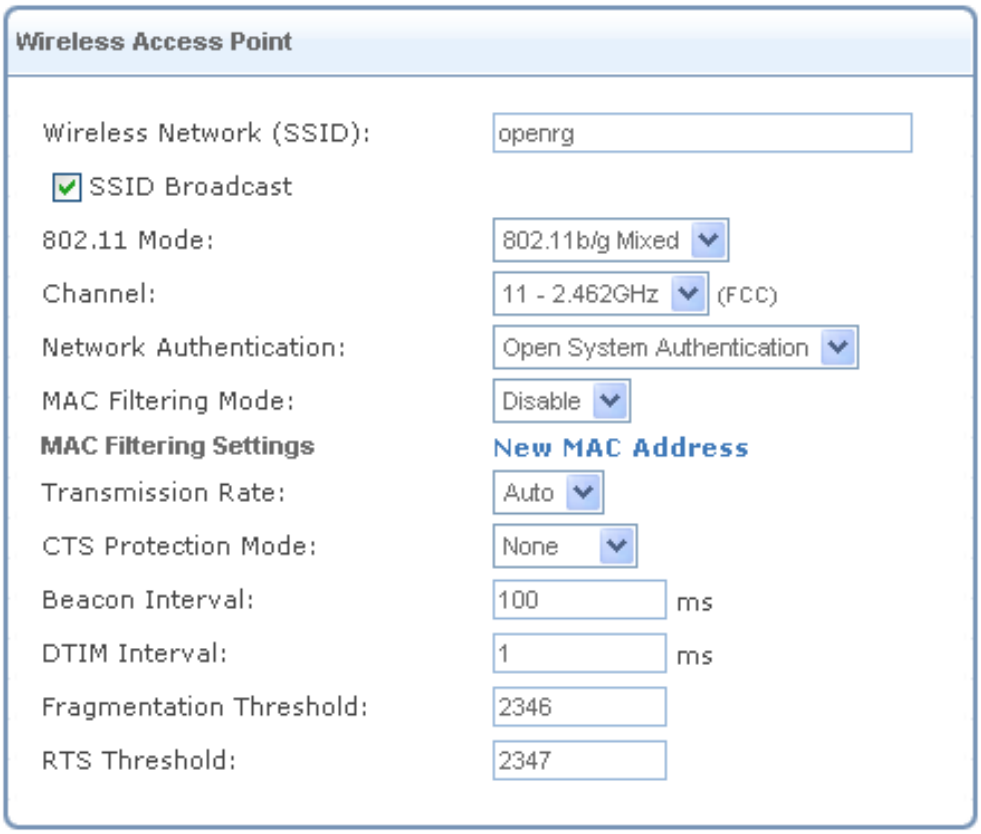


Figure 8.84. Wireless Access Point

SSID The SSID is the network name shared among all points in a wireless network. The SSID must be identical for all points in the wireless network. It is case-sensitive and must not exceed 32 characters (use any of the characters on the keyboard). Make sure this setting is the same for all points in your wireless network. For added security, you should change the default SSID (openrg) to a unique name.

SSID Broadcast Select this check-box to enable the SSID's broadcast. SSID broadcast is used in order to hide the name of the AP (SSID) from clients that should not be aware to its existence.

802.11 Mode Select the Wireless communication standard that is compatible with you PC's wireless card. You can work in either 802.11g, 802.11b or in mixed mode.

Channel Select the appropriate channel from the list provided to correspond with your network settings. All devices in your wireless network must broadcast on different channels in order to function correctly. The channels available depend on the Regulatory Authority (stated in brackets) to which your gateway conforms. For example, in the U.S.A. the Regulatory Authority is the FCC (Federal Communications Commission).

Country The name of the country with which your gateway is configured. This parameter further specifies your wireless connection.

SuperG Mode Enable or disable the SuperG mode using the drop down menu. Note that this feature is not supported by all wireless cards.

Network Authentication The WPA network authentication method is 'Open System Authentication', meaning that a network key is not used for authentication. When using the 802.1X WEP or Non-802.1X WEP security protocols, this field changes to a combo box, offering the 'Shared Key Authentication' method (which uses a network key for authentication), or both methods combined.

MAC Filtering Mode You can filter wireless users according to their MAC address, either allowing or denying access. Choose the action to be performed by selecting it from the drop down menu.

MAC Filtering Settings Use this section to define advanced wireless access point settings. Click 'New MAC Address' to define filtering of MAC addresses. The 'MAC Filtering Settings' screen will appear (see figure Figure 8.85).

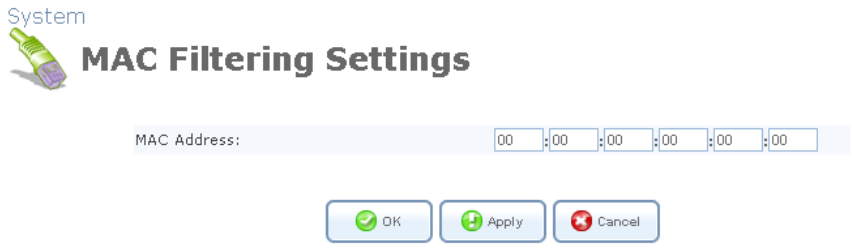


Figure 8.85. MAC Filtering Settings

Enter the MAC address to be filtered and click 'OK' button. A MAC address list will appear, upon which the selected filtering action (allow/deny) will be performed.

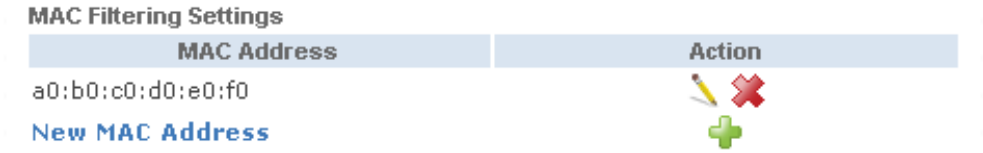


Figure 8.86. MAC Filtering List

Transmission Rate The transmission rate is set according to the speed of your wireless connection. Select the transmission rate from the drop down list, or select 'Auto' to have OpenRG automatically use the fastest possible data transmission rate.

CTS Protection Mode CTS Protection Mode boosts your gateway's ability to intercept Wireless-G and 802.11b transmissions. Conversely, CTS Protection Mode decreases performance. Leave this feature disabled unless you encounter severe communication difficulties between the gateway and Wireless-G products.

Beacon Interval A beacon is a packet broadcast by OpenRG to synchronize the wireless network. The Beacon Interval value indicates how often the beacon is sent.

DTIM Interval The Delivery Traffic Indication Message (DTIM) is a countdown value that informs wireless clients of the next opportunity to receive multicast and broadcast messages. This value ranges between 1 and 16384.

Fragmentation Threshold Packets that are larger than this threshold are fragmented into multiple packets. Try to increase the fragmentation threshold if you encounter high packet error rates. Do not set the threshold too low, since this can result in reduced networking performance.

RTS Threshold OpenRG sends Request to Send (RTS) packets to the Wireless client in order to negotiate the dispatching of data. The Wireless client responds with a Clear to Send (CTS) packet, signaling that transmission can commence. In case packets are smaller than the preset threshold, the RTC/CTS mechanism is not active. If you encounter inconsistent data flow, try a minor reduction of the RTS threshold size.

Wireless Security Use this section to configure your wireless security settings. Select the type of security protocol in the 'Stations Security Type' combo box. The screen refreshes, presenting each protocol's configuration respectively.

- **None** Selecting this option disables security on your wireless connection.

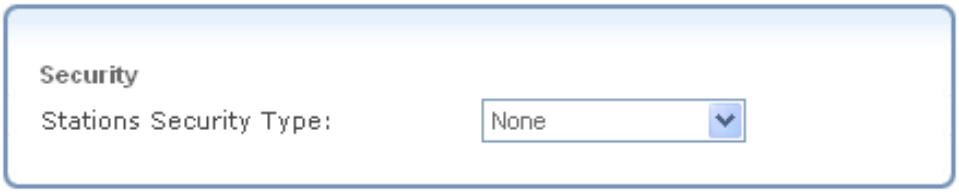


Figure 8.87. Disabled Wireless Security

- **WPA** WPA is a data encryption method for 802.11 wireless LANs (see section Section 8.4.6.5).

  Authentication Method Select the authentication method you would like to use. You can choose between Pre-Shared Key and 802.1x.

  Pre-Shared Key This entry appears only if you had selected this authentication method. Enter your encryption key in the 'Pre-Shared Key' field. You can use either an ASCII or a Hex value by selecting the value type in the combo box provided.

  Encryption Algorithm Select between Temporal Key Integrity Protocol (TKIP) and Advanced Encryption Standard (AES) for the encryption algorithm.

  Group Key Update Interval Defines the time interval in seconds for updating a group key.

  Inter Client Privacy Select the check box to prevent communication between the wireless network clients using the same access point. Clients will not be able to view and access each other's shared directories.

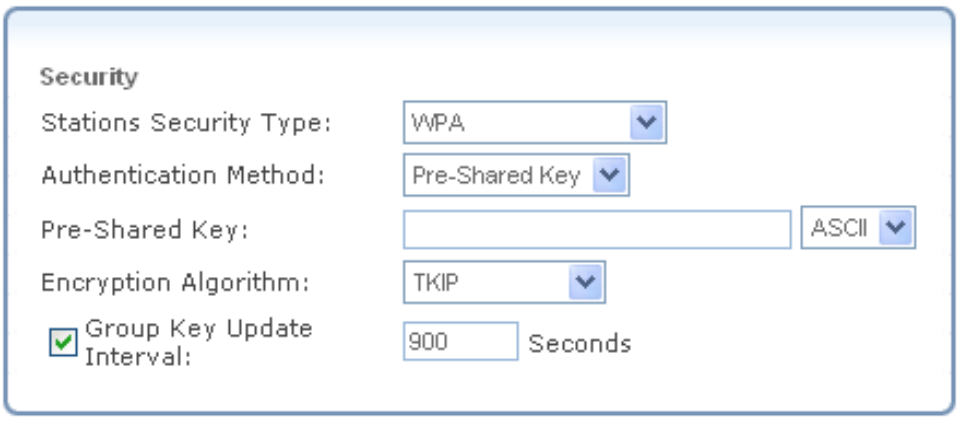


Figure 8.88. WPA Wireless Security Parameters

- **WPA2** WPA2 is an enhanced version of WPA, and defines the 802.11i protocol.

  Authentication Method Select the authentication method you would like to use. You can choose between Pre-Shared Key and 802.1x.

  Pre-Shared Key This entry appears only if you had selected this authentication method. Enter your encryption key in the 'Pre-Shared Key' field. You can use either an ASCII or a Hex value by selecting the value type in the combo box provided.

  Pre Authentication When selecting the 802.1x authentication method, these two entries appear (see figure Figure 8.89). Select this option to enable OpenRG to accept RADIUS authentication requests from computers connected to other access points. This enables roaming from one wireless network to another.

PMK Cache Period The number of minutes before deletion (and renewal) of the Pairwise Master Key used for authentication.

Figure 8.89. 802.1x Authentication Method

Encryption Algorithm The encyption algorithm used for WPA2 is the Advanced Encryption Standard (AES).

Group Key Update Interval Defines the time interval in seconds for updating a group key.

Inter Client Privacy Select the check box to prevent communication between the wireless network clients using the same access point. Clients will not be able to view and access each other's shared directories.

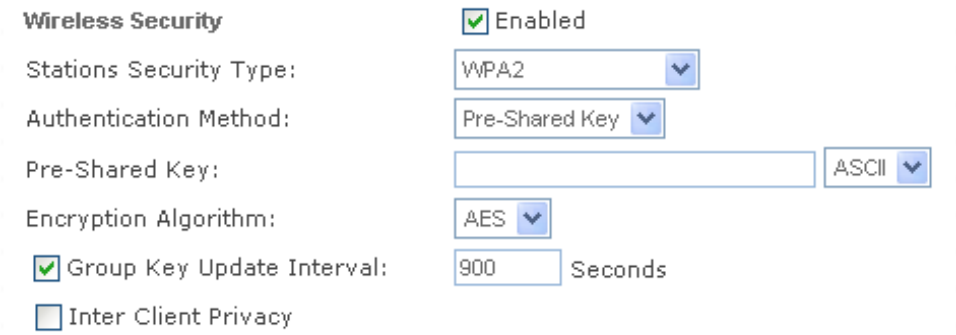


Figure 8.90. WPA2 Wireless Security Parameters

- **WPA and WPA2 Mixed Mode** WPA and WPA2 is a mixed data encryption method.

Authentication Method Select the authentication method you would like to use. You can choose between Pre-Shared Key and 802.1x.

Pre-Shared Key This entry appears only if you had selected this authentication method. Enter your encryption key in the 'Pre-Shared Key' field. You can use either an ASCII or a Hex value by selecting the value type in the combo box provided.

Pre Authentication When selecting the 802.1x authentication method, these two entries appear (see figure Figure 8.91). Select this option to enable OpenRG to accept RADIUS authentication requests from computers connected to other access points. This enables roaming from one wireless network to another.

PMK Cache Period The number of minutes before deletion (and renewal) of the Pairwise Master Key used for authentication.

Figure 8.91. 802.1x Authentication Method

Encryption Algorithm The encyption algorithm used for WPA and WPA2 is a either the Temporal Key Integrity Protocol (TKIP) or the Advanced Encryption Standard (AES).

Group Key Update Interval Defines the time interval in seconds for updating a group key.

Inter Client Privacy Select the check box to prevent communication between the wireless network clients using the same access point. Clients will not be able to view and access each other's shared directories.

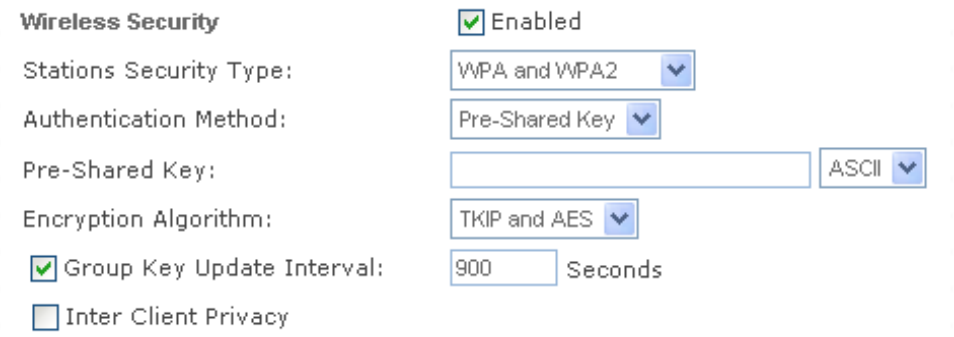


Figure 8.92. WPA and WPA2 Wireless Security Parameters

- **802.1x WEP** 802.1x WEP is a data encryption method utilizing an automatically defined key for wireless clients that use 802.1x for authentication and WEP for encryption.

  Inter Client Privacy Select the check box to prevent communication between the wireless network clients using the same access point. Clients will not be able to view and access each other's shared directories.

  RADIUS Server Configure the RADIUS Server parameters (for more information, see section Section 7.13.4).

  Server IP Enter the RADIUS server's IP address.

  Server Port Enter the RADIUS server's port.

  Shared Secret Enter your shared secret.

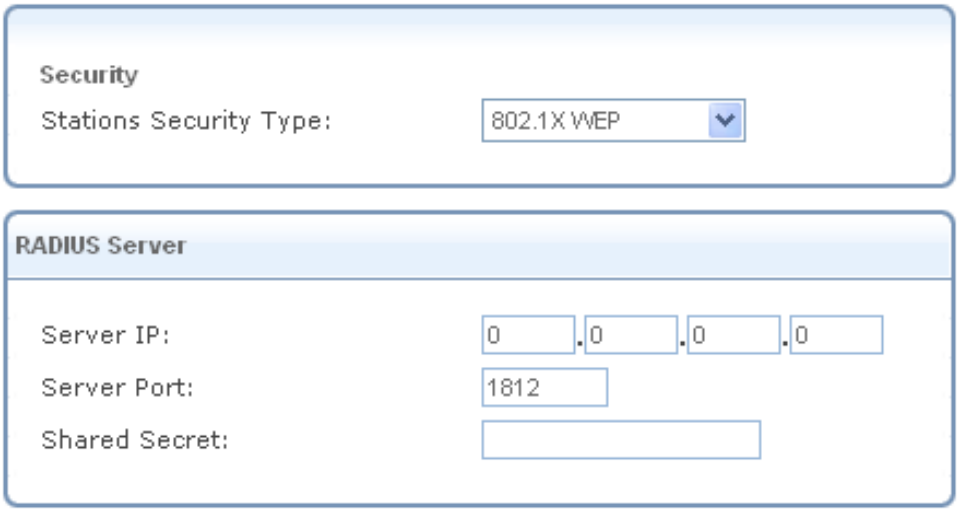


Figure 8.93. 802.1x WEP Wireless Security Parameters

- **Non-802.1x WEP** Non-802.1x WEP is a data encryption method utilizing a statically defined key for wireless clients that do not use 802.1x for authentication, but use WEP for encryption. You may define up to four keys but use only one at a time. Note that the static key must be defined in the wireless Windows client as well.

  Inter Client Privacy Select the check box to prevent communication between the wireless network clients using the same access point. Clients will not be able to view and access each other's shared directories.

Active Select the encryption key to be activated.

Encryption Key Type the encryption key until the entire field is filled. The key cannot be shorter than the field's length.

Entry Method Select the character type for the key: ASCII or HEX.

Key Length Select the key length in bits: 40 or 104 bits.

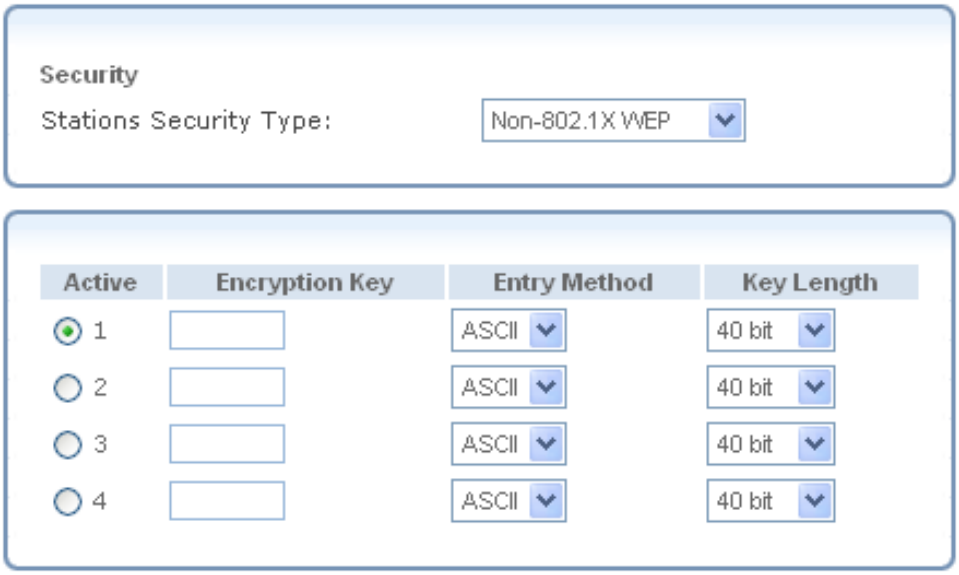


Figure 8.94. Non-802.1x WEP Wireless Security Parameters

The encryption key must be defined in the wireless Windows client as well. This is done in the Connection Properties Configuration window (to learn how to reach this window, please refer to section Section 8.4.6.5.2 [441]).

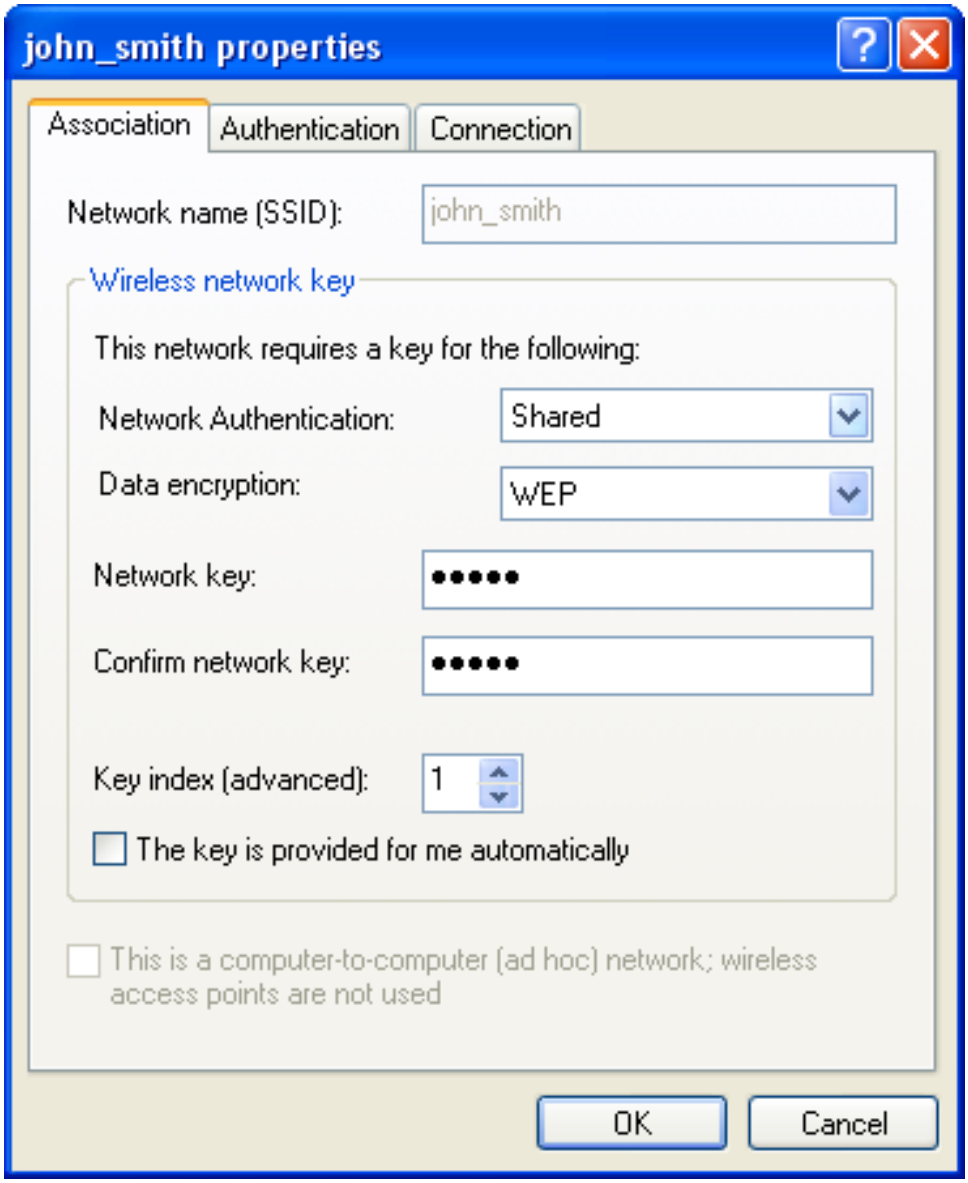


Figure 8.95. Connection Properties Configuration

1. In the 'Network Authentication' combo box, select "Shared".
2. In the 'Data Encryption' combo box, select "WEP".
3. Enter your encryption key in both the 'Network key' and the 'Confirm network key' fields.

- **Authentication Only** When selecting this option, wireless clients attempting to connect to the wireless connection will receive OpenRG's main login screen, along with the following attention message:

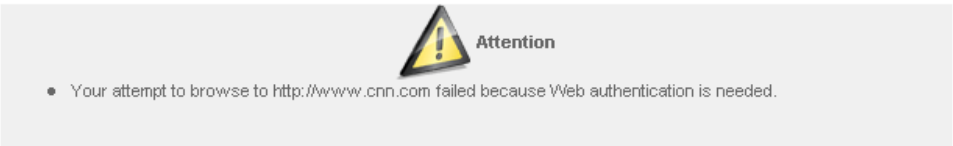


Figure 8.96. Web Authentication Needed

By logging into the WBM, clients authenticate themselves and are then able to use the connection. OpenRG keeps record of authenticated clients. To clear this list, click the 'Clean Mac List' button. Clients will have to re-authenticate themselves in order to use the wireless connection.

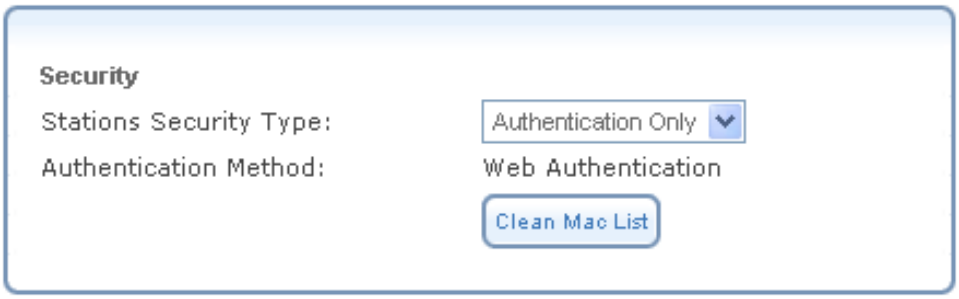


Figure 8.97. Authentication Only Wireless Security Parameters

8.4.6.9. Virtual Access Points

You can set up multiple virtual wireless LANs on OpenRG, limited only to the number supported by your wireless card. Such virtual wireless LANs are referred to as "Virtual APs" (virtual access points).

Note: Different wireless cards support different numbers of virtual access points. The scenarios depicted herein refer to the **Ralink RT-2561** wireless card, supporting up to four virtual wireless access points.

The 'Virtual APs' section appears under the 'Wireless' sub-tab of the 'LAN Wireless 802.11g Access Point Properties' screen, and displays OpenRG's physical wireless access point, on top of which virtual connections may be created.

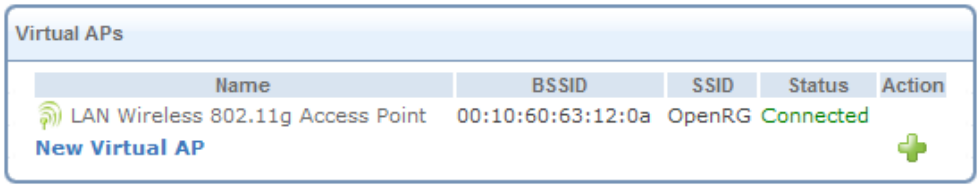


Figure 8.98. Virtual APs

To create a virtual connection, click the 'New Virtual AP' link. The screen refreshes, displaying the new virtual connection.

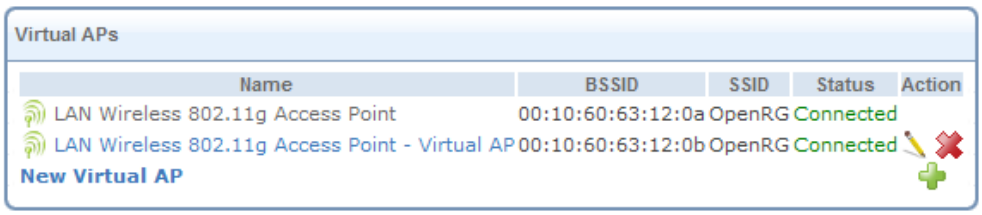


Figure 8.99. New Virtual Access Point

The new connection will also be added to the network connections list, and will be configurable like any other connection.

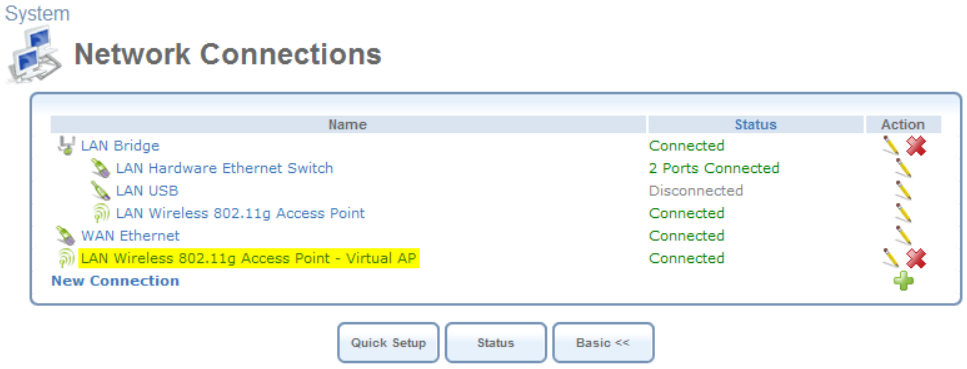


Figure 8.100. Network Connections

You can edit the new virtual access point's properties by clicking its action icon . The 'LAN Wireless 802.11g Access Point - Virtual AP Properties' screen appears. For example, change the connection's default name by changing the SSID value in the 'Wireless' sub-tab.

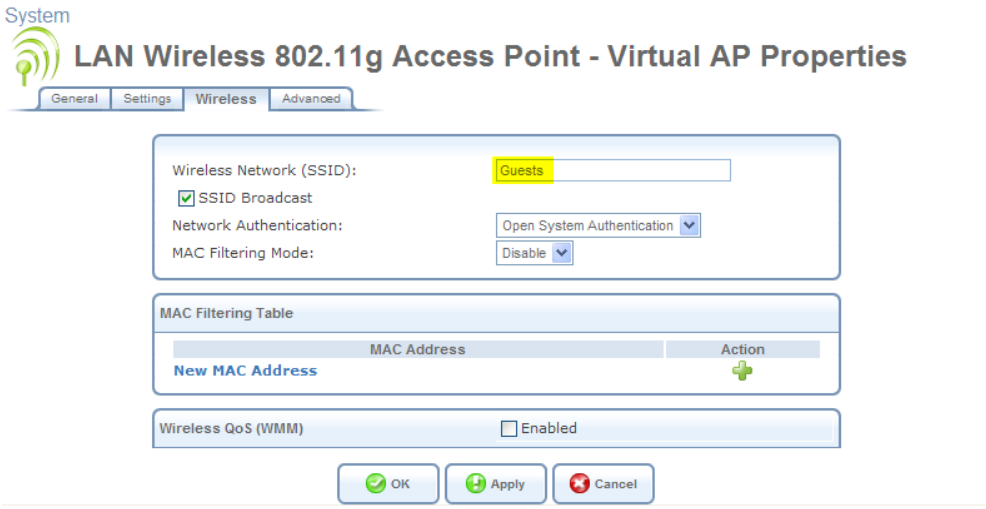


Figure 8.101. LAN Wireless 802.11g Access Point - Virtual AP Properties

A usage example for this virtual connection is to dedicate it for guest access. Through this connection, guests will be able access the WAN, but be denied access to other wireless LANs provided by OpenRG. To do so, perform the following steps:

1. Set a firewall rule that blocks access to all other OpenRG LANs.

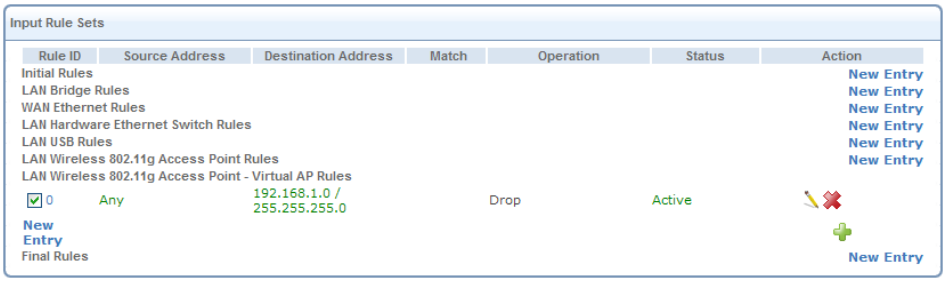


Figure 8.102. Firewall Rule

   To learn how to do so, please refer to section Section 7.3.9.

2. Back in the virtual connection's 'LAN Wireless 802.11g Access Point - Virtual AP Properties' screen:

a. In the 'Internet Protocol' section under the 'Settings' sub-tab, enter an IP address for the connection by selecting 'Use the Following IP Address'.

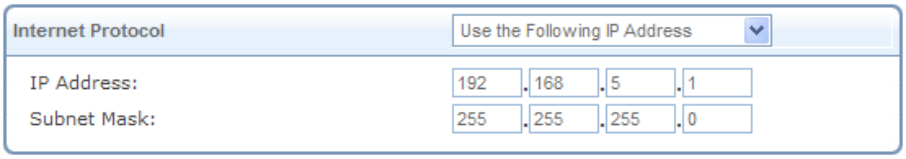


Figure 8.103. Internet Protocol

b. In the 'IP Address Distribution' section under the 'Settings' sub-tab, select 'DHCP Server' and enter the IP range from which IP addresses will be granted to wireless guests.

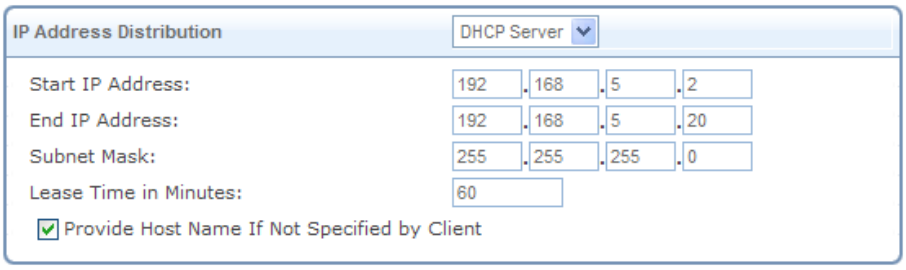

IP Address Distribution
DHCP Server
Start IP Address:
192 . 168 . 5 . 2
End IP Address:
192 . 168 . 5 . 20
Subnet Mask:
255 . 255 . 255 . 0
Lease Time in Minutes:
60
Provide Host Name If Not Specified by Client

Figure 8.104. IP Address Distribution

c. Click 'OK' to save the settings.

Safely assuming that you have secured all of your other wireless connections, a guest will now be granted access solely to the "Guests" wireless LAN, from which he/she will have WAN access alone.

8.4.6.10. Wireless WDS

OpenRG supports Wireless Distribution System (WDS), which enables wireless bridging of access points within its range. Virtual access points are used to interact with OpenRG's WDS peers, granting LAN users access to remote wireless networks.

Note: Different wireless cards support different numbers of virtual access points. The scenarios depicted herein refer to the **Ralink RT-2561** wireless card, supporting up to four virtual wireless access points.

Select the 'Enabled' check-box. The screen will refresh (see figure Figure 8.105).

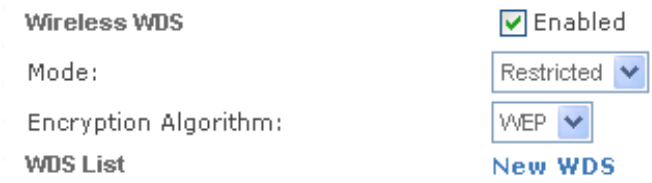


Figure 8.105. Wireless WDS

Mode OpenRG's WDS can function in one of the following modes:

- Restricted -- WDS peers must be registered with OpenRG (by MAC addresses).
- Bridge -- OpenRG will function as a wireless bridge, merely forwarding traffic between access points, and will not respond to wireless requests. The WDS peers must be manually stated and wireless stations will not be able to connect to OpenRG.

- Repeater -- OpenRG will act as a repeater, interconnecting between access points. WDS peers can be determined by the user ('Restricted' mode) or auto-detected ('Lazy' mode).

- Lazy -- Automatic detection of WDS peers: when a LAN user searches for a network, OpenRG will attempt to connect to WDS devices in its vicinity.

Encryption Algorithm When wireless security is enabled (see section Wireless Security), this combo-box will display the encryption algorithms available for encrypting the communication between access points.
To add a WDS device, perform the following:

1. Click the 'New WDS' link, and press 'Apply'. If an 'Attention' screen appears, press 'OK'. The screen will refresh (see figure Figure 8.106). A new virtual device will appear in the WDS list, with the initial status of disabled.

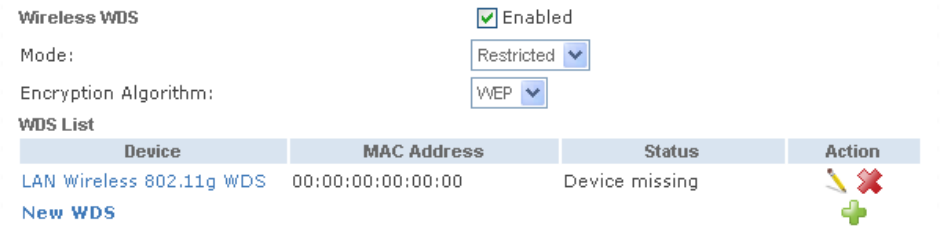


Figure 8.106. Wireless WDS -- New WDS

Note that devices added to the WDS list before the WDS feature is enabled in the main device will appear as missing.

2. Click the new device's action icon . The 'LAN Wireless 802.11g WDS Properties' screen will appear (see figure Figure 8.107).

Figure 8.107. LAN Wireless 802.11g WDS Properties

3. Click the Wireless tab, and enter the MAC address of the WDS peer with which this virtual access point is to interact, in the 'Other AP' section.

Figure 8.108. LAN Wireless 802.11g WDS Properties -- Wireless Tab

4. Click 'OK'. The 'Network Connections' screen appears, displaying the new virtual 'LAN Wireless 802.11g WDS' connection (see figure Figure 8.109).

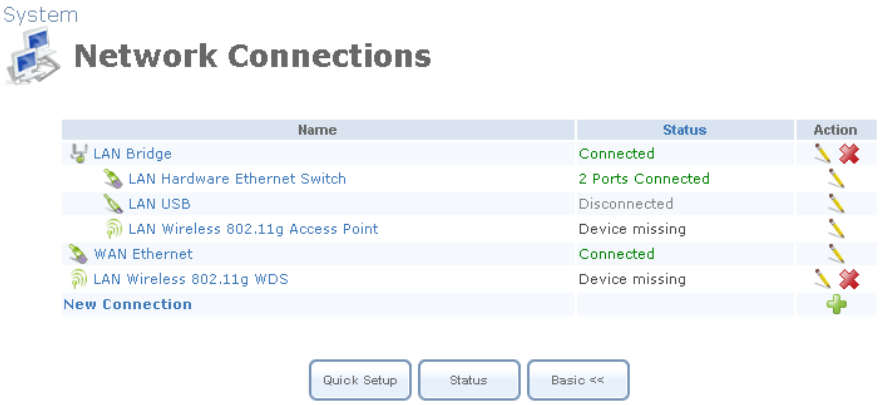


Figure 8.109. Network Connections

5. Click the virtual connection's action icon . The 'LAN Wireless 802.11g WDS Properties' screen reappears (see figure Figure 8.110).

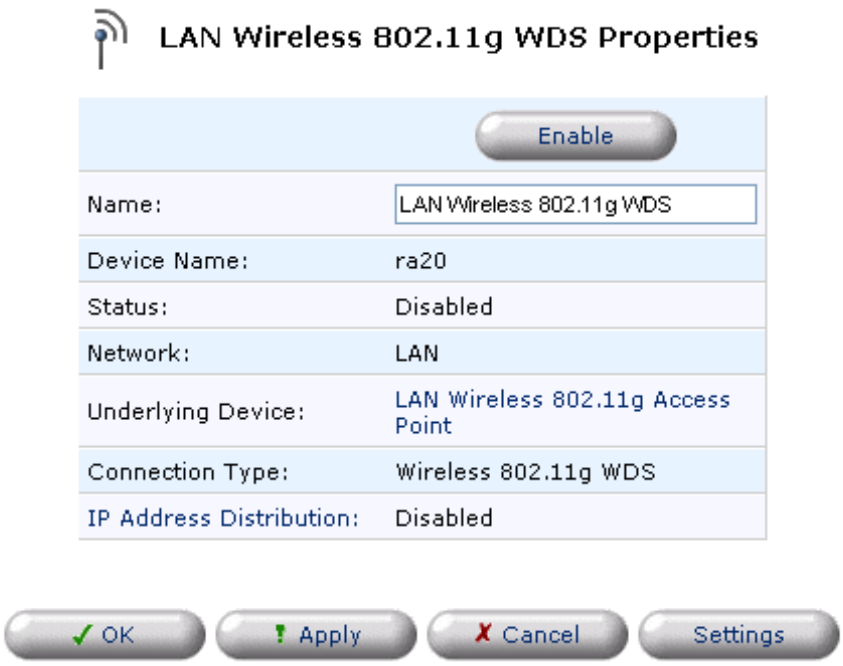


Figure 8.110. LAN Wireless 802.11g WDS Properties

6. Press the 'Enable' button. The virtual connection is now enabled. Go back to the physical wireless connection configuration screen to view its details (see figure Figure 8.111).

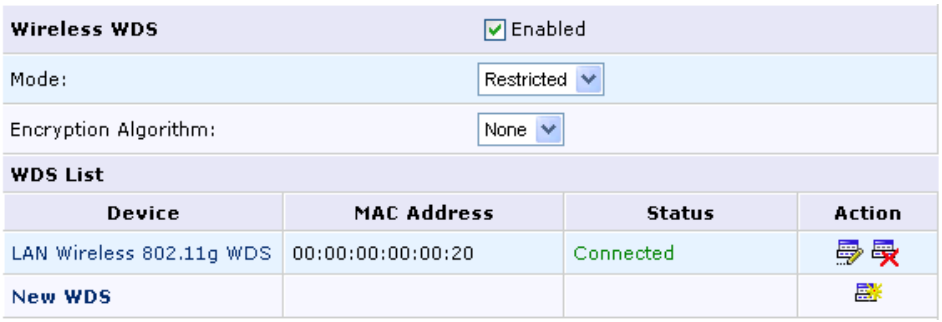


Figure 8.111. Wireless WDS

If the WDS peer also operates in 'Restricted' mode, it should similarly be configured with OpenRG's MAC address in order for both access points to communicate.

8.4.6.11. Wireless QoS (WMM)

Wi-Fi Multimedia (WMM) is a Wi-Fi Alliance certification, based on the IEEE 802.11e draft standard. It provides basic Quality of Service (QoS) features to IEEE 802.11 networks. If your wireless card supports WMM, enable this feature by checking its 'Enabled' check-box. The screen will refresh (see figure Figure 8.112).

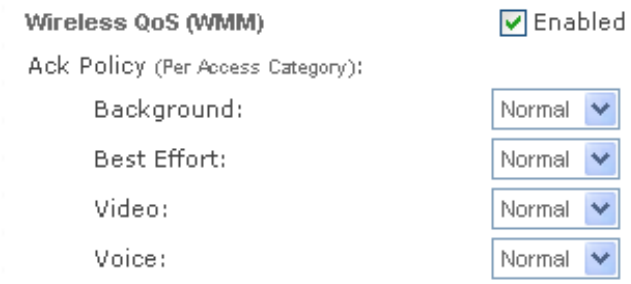


Figure 8.112. Wireless QoS (WMM)

Background, Best Effort, Video and Voice are access categories for packet prioritization. Upon enabling WMM, the highest priority is given to Voice packets, decreasing towards Background packets which receive the lowest priority. In addition, you can control the reliability of traffic flow. By default, the 'Ack Policy' for each access category is set to "Normal", meaning that an acknowledge packet is returned for every packet received. This provides a more reliable transmission but increases traffic load, which decreases performance. You may choose to cancel the acknowledgement by selecting "No Ack" in the combo-box of each access category, thus changing the Ack policy. This can be useful for Voice, for example, where speed of transmission is important and packet loss is tolerable to a certain degree.

8.4.6.12. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

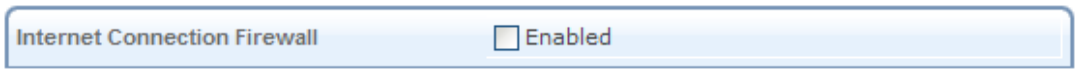


Figure 8.113. Internet Connection Firewall

- **Additional IP Addresses** You can add alias names (additional IP addresses) to the gateway by clicking the 'New IP Address' link. This enables you to access the gateway using these aliases in addition to the 192.168.1.1 and the http://openrg.home.

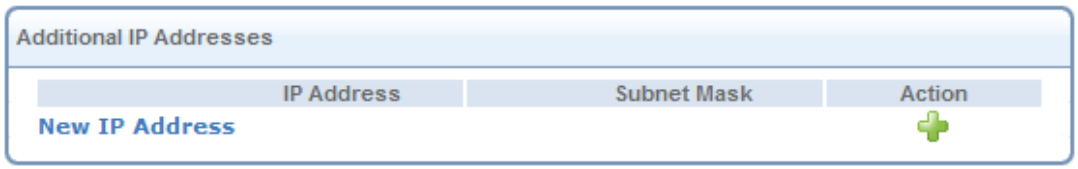


Figure 8.114. Additional IP Addresses

8.4.7. WAN Ethernet

The WAN Ethernet connection can connect OpenRG to another network either directly or via an external modem. The Connection Wizard provides three methods to quickly configure this connection, described later in this chapter:

1. Ethernet Connection (see section Section 8.4.9).
2. Dynamic Host Configuration Protocol (see section Section 8.4.16).
3. Manual IP Address Configuration (see section Section 8.4.17).

8.4.7.1. General

To view and edit the WAN Ethernet connection settings, click the 'WAN Ethernet' link in the 'Network Connections' screen (see figure Figure 8.10). The 'WAN Ethernet Properties' screen will appear (see figure Figure 8.115), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

Figure 8.115. WAN Ethernet Properties

8.4.7.2. Settings

General This section displays the connection's general parameters. It is recommended not to change the default values unless familiar with the networking concepts they represent. Since your gateway is configured to operate with the default values, no parameter modification is necessary.

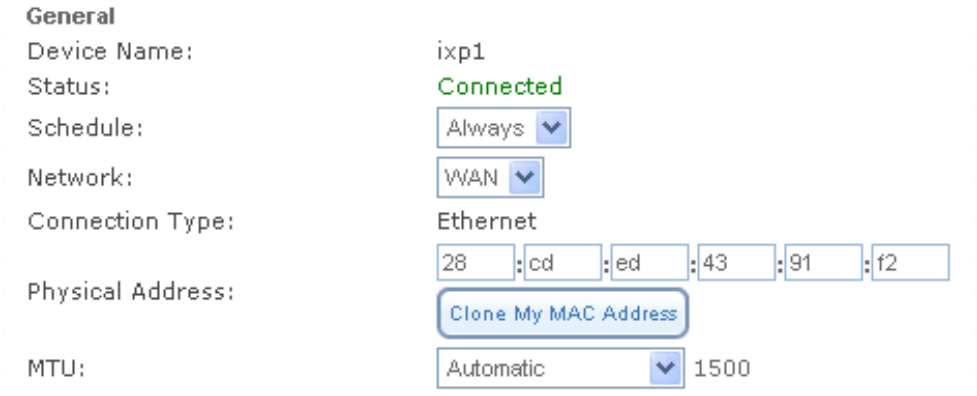


Figure 8.116. General

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

Physical Address The physical address of the network card used for your network. Some cards allow you to change this address.

Clone My MAC Address Press this button to copy your PC's current MAC address to the board.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

Internet Protocol Select one of the following Internet protocol options from the 'Internet Protocol' combo-box:

- No IP Address
- Obtain an IP Address Automatically
- Use the Following IP Address

Please note that the screen will refresh to display relevant configuration settings according to your choice.

No IP Address Select 'No IP Address' if you require that your gateway have no IP address. This can be useful if you are working in an environment where you are not connected to other networks, such as the Internet.

Figure 8.117. Internet Protocol -- No IP Address

Obtain an IP Address Automatically Your connection is configured by default to act as a DHCP client. You should keep this configuration in case your service provider supports DHCP, or if you are connecting using a dynamic IP address. The server that assigns the gateway with an IP address, also assigns a subnet mask. You can override the dynamically assigned subnet mask by selecting the 'Override Subnet Mask' and specifying your own mask instead. You can press the 'Release' button to release the current leased IP address. Once the address has been released, the button text changes to 'Renew'. Use the 'Renew' button to renew the leased IP address.

Figure 8.118. Internet Protocol Settings -- Automatic IP

Use the Following IP Address Your connection can be configured using a permanent (static) IP address. Your service provider should provide you with such an IP address and subnet mask.

Figure 8.119. Internet Protocol -- Static IP

DNS Server Domain Name System (DNS) is the method by which Web site domain names are translated into IP addresses. You can configure the connection to automatically obtain a DNS server address, or specify such an address manually, according to the information provided by your ISP. To configure the connection to automatically obtain a DNS server address, select 'Obtain DNS Server Address Automatically' from the 'DNS Server' drop down menu.

Figure 8.120. DNS Server -- Automatic IP

To manually configure DNS server addresses, select 'Use the Following DNS Server Addresses' from the 'DNS Server' drop down menu (see figure 'DNS Server -- Static IP'). Specify up to two different DNS server address, one primary, another secondary.

Figure 8.121. DNS Server -- Static IP

To learn more about this feature, turn to chapter Section 7.13.1 .

IP Address Distribution The 'IP Address Distribution' section allows you to configure the gateway's Dynamic Host Configuration Protocol (DHCP) server parameters. The DHCP automatically assigns IP addresses to network PCs. If you enable this feature, make sure that you also configure your network PCs as DHCP clients. For a comprehensive description of this feature, please refer to section Section 7.13.2 . Select one of the following options from the 'IP Address Distribution' combo-box:

- DHCP Server

1. **Start IP Address** The first IP address that may be assigned to a LAN host. Since the gateway's default IP address is 192.168.1.1, this address must be 192.168.1.2 or greater.

   End IP Address The last IP address in the range that can be used to automatically assign IP addresses to LAN hosts.

   Subnet Mask A mask used to determine to what subnet an IP address belongs. An example of a subnet mask value is 255.255.0.0.

   Lease Time In Minutes Each device will be assigned an IP address by the DHCP server for a this amount of time, when it connects to the network. When the lease expires the server will determine if the computer has disconnected from the network. If it has, the server may reassign this IP address to a newly-connected computer. This feature ensures that IP addresses that are not in use will become available for other computers on the network.

   Provide Host Name If Not Specified by Client If the DHCP client does not have a host name, the gateway will automatically assign one for him.

2. Click 'OK' to save the settings.

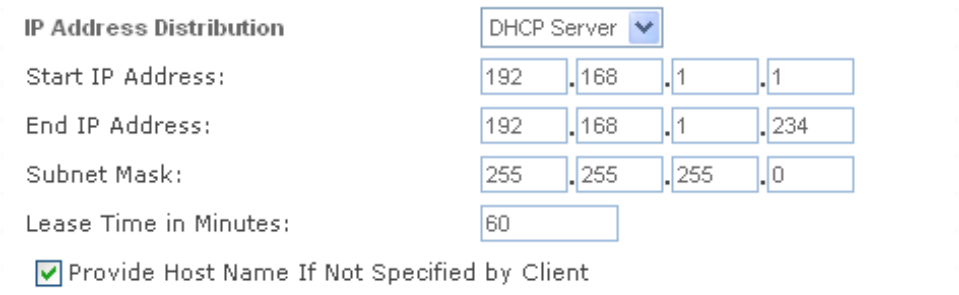
- 
IP Address Distribution
DHCP Server
Start IP Address:
192 . 168 . 1 . 1
End IP Address:
192 . 168 . 1 . 234
Subnet Mask:
255 . 255 . 255 . 0
Lease Time in Minutes:
60
Provide Host Name If Not Specified by Client

Figure 8.122. IP Address Distribution -- DHCP Server

- DHCP Relay Your gateway can act as a DHCP relay in case you would like to dynamically assign IP addresses from a DHCP server other than your gateway's DHCP server. Note that when selecting this option you must also change OpenRG's WAN to work in routing mode. For more information, see section Section 7.13.2.2 .

  1. After selecting 'DHCP Relay' from the drop down menu, a 'New IP Address' link will appear:

Figure 8.123. IP Address Distribution - DHCP Relay

Click the 'New IP Address' link. The 'DHCP Relay Server Address' screen will appear:

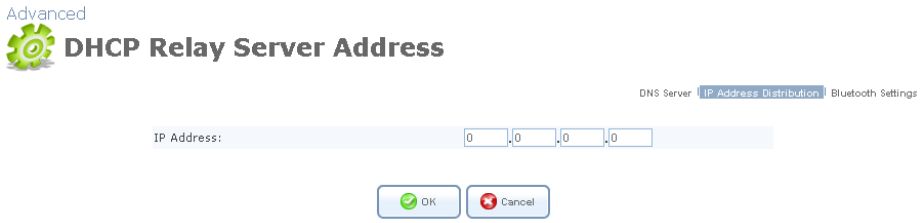


Figure 8.124. DHCP Relay Server Address

  2. Specify the IP address of the DHCP server.

  3. Click 'OK' to save the settings.

- Disabled Select 'Disabled' from the combo-box if you would like to statically assign IP addresses to your network computers.

Figure 8.125. IP Address Distribution - Disable DHCP

8.4.7.3. Routing

You can choose to setup your gateway to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Routing Mode Select one of the following routing modes:

Route Use route mode if you want your gateway to function as a router between two networks.

NAPT Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.

Device Metric The device metric is a value used by the gateway to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.

Default Route Select this check box to define this device as a the default route.

Routing Information Protocol (RIP) Select this check box to enable the Routing Information Protocol (RIP). RIP determines a route based on the smallest hop count between source and destination. When RIP is enabled, select the following:

- Listen to RIP messages - select 'None', 'RIPv1', 'RIPv2' or 'RIPv1/2'.

- Send RIP messages - select 'None', 'RIPv1', 'RIPv2-broadcast' or 'RIPv2-multicast'.

Multicast - IGMP Proxy Internal IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups. Select the 'Multicast IGMP Proxy Internal' check-box to enable this feature.

IGMP Query Version OpenRG supports all three versions of IGMP. Select the version you would like to use.

Routing Table Allows you to add or modify routes when this device is active. Use the 'New Route' button to add a route or edit existing routes.

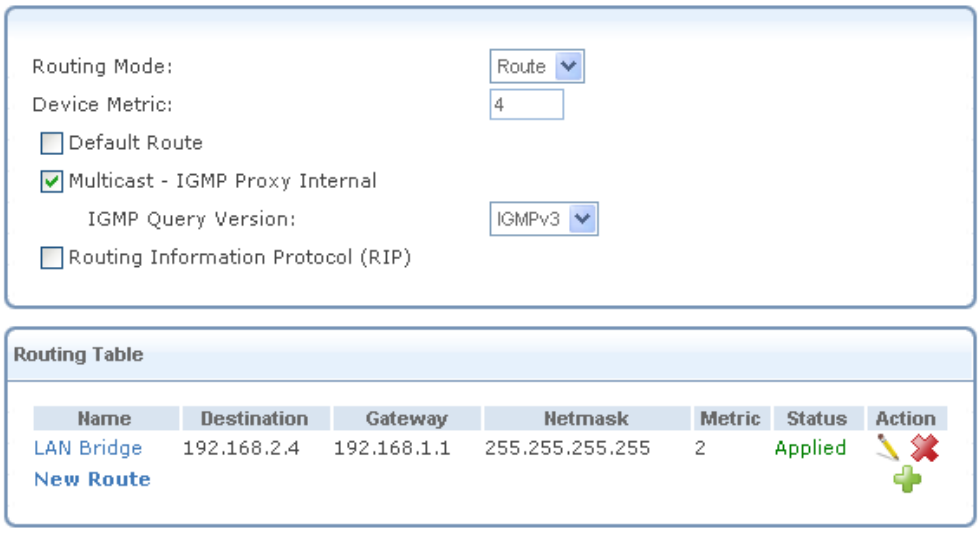


Figure 8.126. Advanced Routing Properties

To learn more about this feature, please refer to chapter Section 8.6.1 .

8.4.7.4. IPv6

Click on the 'New Unicast Address' link to add an IPv6 unicast address. To learn more about configuring IPv6 settings, refer to Section 8.6.2.

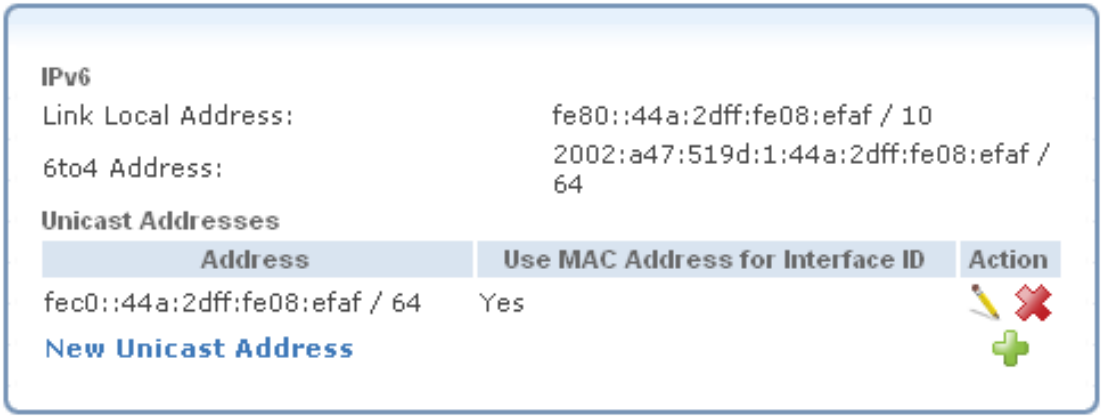


Figure 8.127. IPv6 Settings

8.4.7.5. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be

activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

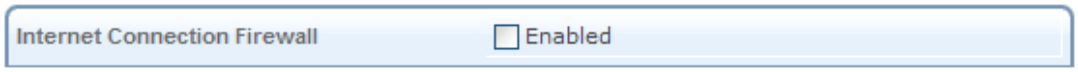


Figure 8.128. Internet Connection Firewall

- **Additional IP Addresses** You can add alias names (additional IP addresses) to the gateway by clicking the 'New IP Address' link. This enables you to access the gateway using these aliases in addition to the 192.168.1.1 and the http://openrg.home.

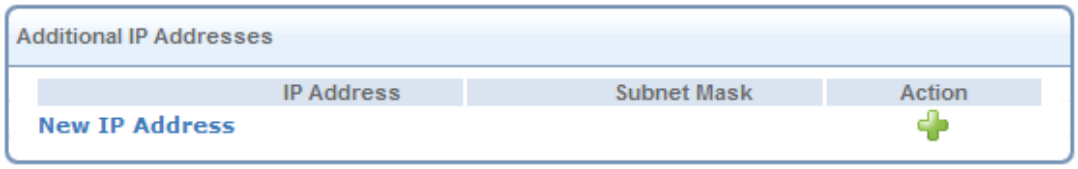


Figure 8.129. Additional IP Addresses

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

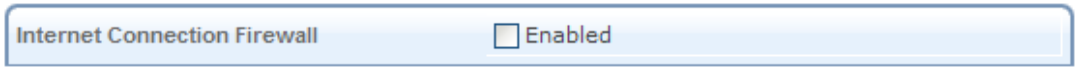


Figure 8.130. Internet Connection Firewall

Internet Connection Fastpath Select this check box to utilize the *Fastpath* algorithm for enhancing packet flow, resulting in faster communication between the LAN and the WAN. By default, this feature is enabled.

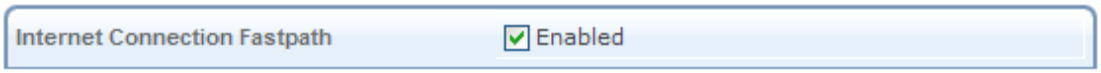


Figure 8.131. Internet Connection Fastpath

- **Additional IP Addresses** You can add alias names (additional IP addresses) to the gateway by clicking the 'New IP Address' link. This enables you to access the gateway using these aliases in addition to the 192.168.1.1 and the http://openrg.home.

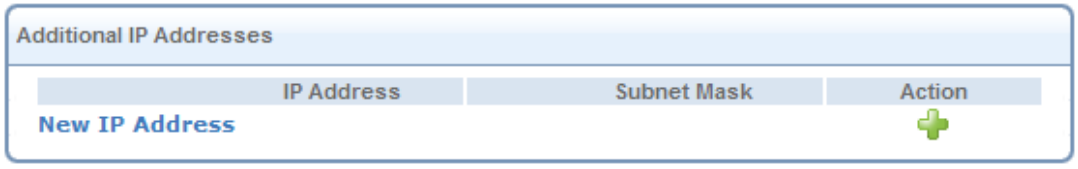


Figure 8.132. Additional IP Addresses

8.4.8. Point-to-Point Protocol over Ethernet (PPPoE)

Point-to-Point Protocol over Ethernet (PPPoE) relies on two widely accepted standards, PPP and Ethernet. PPPoE enables your home network PCs that communicate on an Ethernet network to exchange information with PCs on the Internet. PPPoE supports the protocol layers and authentication widely used in PPP and enables a point-

to-point connection to be established in the normally multipoint architecture of Ethernet. A discovery process in PPPoE determines the Ethernet MAC address of the remote device in order to establish a session.

8.4.8.1. Creation with the Connection Wizard

To create a new PPPoE connection, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.11).

2. Select the Internet Connection radio button and click Next. The 'Internet Connection' screen will appear (see figure Figure 8.12).

1. Select the External DSL Modem radio button and click Next. The 'Point-to-Point Protocol over Ethernet' screen will appear (see figure Figure 8.133).

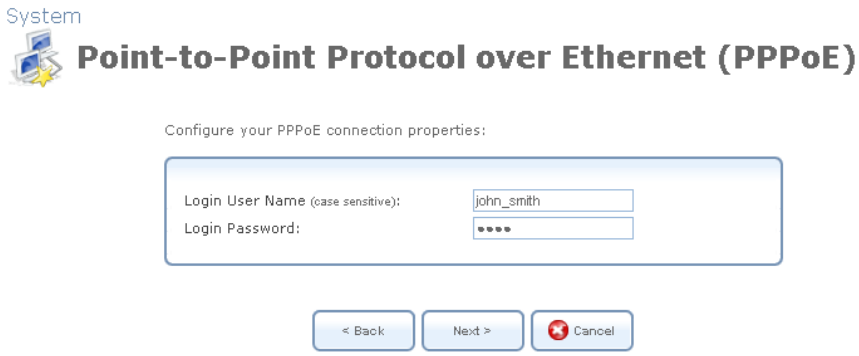


Figure 8.133. Point-to-Point Protocol over Ethernet

2. Enter the username and password provided by your Internet Service Provider (ISP), and click Next. The 'Connection Summary' screen will appear (see figure Figure 8.134).

Figure 8.134. Connection Summary

3. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

4. Click Finish to save the settings.

The new PPPoE connection will be added to the network connections list, and will be configurable like any other connection.

Note: If your WAN connection is set to PPPoE when there is no PPPoE server available, and a DHCP server is available instead, the device status will show: "In Progress - DHCP server found, consider configuring your WAN connection to Automatic". If you select this option, please refer to section Section 4.4.1.2 .

8.4.8.2. General

To view and edit the PPPoE connection settings, click the 'WAN PPPoE' link in the 'Network Connections' screen (see figure Figure 8.10). The 'WAN PPPoE Properties' screen will appear (see figure Figure 8.135), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

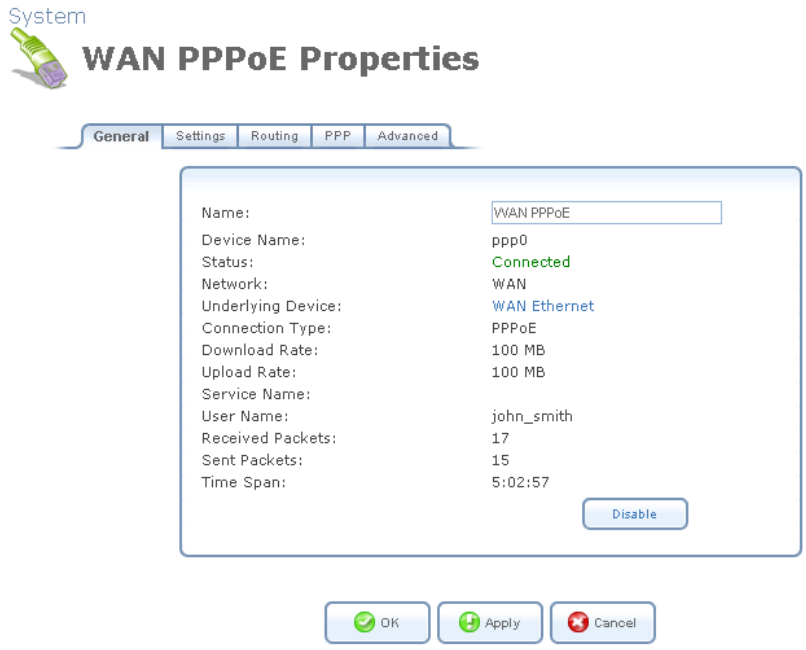


Figure 8.135. WAN PPPoE Properties

8.4.8.3. Settings

General This section displays the connection's general parameters.

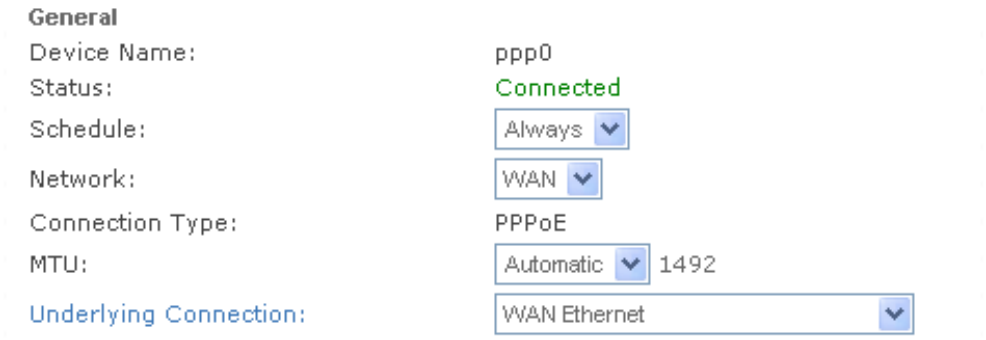


Figure 8.136. General PPPoE Settings

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

Underlying Connection Specify the underlying connection above which the protocol will be initiated.

Internet Protocol Select one of the following Internet protocol options from the 'Internet Protocol' combo-box:

- Unnumbered
- Obtain an IP Address Automatically
- Use the Following IP Address

Please note that the screen will refresh to display relevant configuration settings according to your choice.

Unnumbered Select this option to assign a predefined LAN address as OpenRG's WAN address. This is useful when OpenRG operates in routing mode. Before selecting this option, configure the 'Internet Protocol' of your LAN device (or bridge, in case the LAN device is under a bridge) to use a permanent (static) IP address from the range of IP addresses provided by your ISP (instead of 192.168.1.1).

Figure 8.137. Internet Protocol -- Unnumbered

Obtain an IP Address Automatically Your connection is configured by default to obtain an IP automatically. You should change this configuration in case your service provider requires it. The server that assigns the gateway with an IP address, also assigns a subnet mask. You can override the dynamically assigned subnet mask by selecting the 'Override Subnet Mask' and specifying your own mask instead.

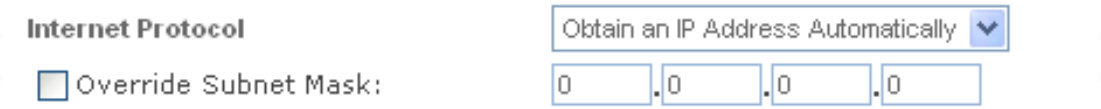


Figure 8.138. Internet Protocol -- Automatic IP

Use the Following IP Address Your connection can be configured using a permanent (static) IP address. Your service provider should provide you with such an IP address and subnet mask.

Figure 8.139. Internet Protocol -- Static IP

DNS Server Domain Name System (DNS) is the method by which Web site domain names are translated into IP addresses. You can configure the connection to automatically obtain a DNS server address, or specify such an address manually, according to the information provided by your ISP. To configure the connection to automatically obtain a DNS server address, select 'Obtain DNS Server Address Automatically' from the 'DNS Server' drop down menu.

Figure 8.140. DNS Server -- Automatic IP

To manually configure DNS server addresses, select 'Use the Following DNS Server Addresses' from the 'DNS Server' drop down menu (see figure 'DNS Server -- Static IP'). Specify up to two different DNS server address, one primary, another secondary.

Figure 8.141. DNS Server -- Static IP

To learn more about this feature, turn to chapter Section 7.13.1 .

8.4.8.4. Routing

You can choose to setup your gateway to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Routing Mode Select one of the following routing modes:

Route Use route mode if you want your gateway to function as a router between two networks.

NAPT Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.

Device Metric The device metric is a value used by the gateway to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.

Default Route Select this check box to define this device as a the default route.

Routing Information Protocol (RIP) Select this check box to enable the Routing Information Protocol (RIP). RIP determines a route based on the smallest hop count between source and destination. When RIP is enabled, select the following:

- Listen to RIP messages - select 'None', 'RIPv1', 'RIPv2' or 'RIPv1/2'.
- Send RIP messages - select 'None', 'RIPv1', 'RIPv2-broadcast' or 'RIPv2-multicast'.

Multicast - IGMP Proxy Internal IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups. Select the 'Multicast IGMP Proxy Internal' check-box to enable this feature.

IGMP Query Version OpenRG supports all three versions of IGMP. Select the version you would like to use.

Routing Table Allows you to add or modify routes when this device is active. Use the 'New Route' button to add a route or edit existing routes.

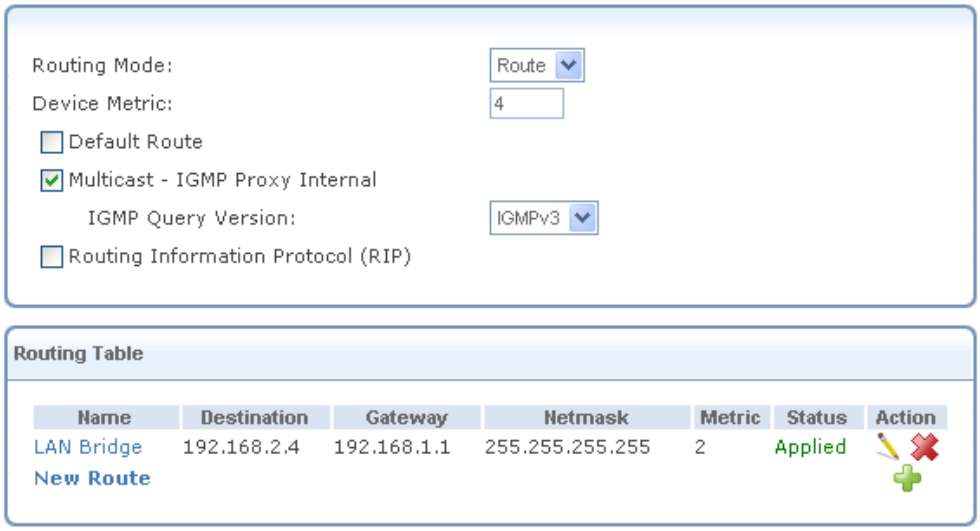


Figure 8.142. Advanced Routing Properties

To learn more about this feature, please refer to chapter Section 8.6.1 .

8.4.8.5. PPP

PPP
Point-to-Point Protocol (PPP) is the most popular method for transporting packets between the user and the Internet service provider. PPP supports authentication protocols such as PAP and CHAP, as well as other compression and encryption protocols.

Service Name Specify the networking peer's service name, if provided by your ISP.

PPP-on-Demand Use PPP on demand to initiate the point-to-point protocol session only when packets are actually sent over the Internet.

Time Between Reconnect Attempts Specify the duration between PPP reconnected attempts, as provided by your ISP.

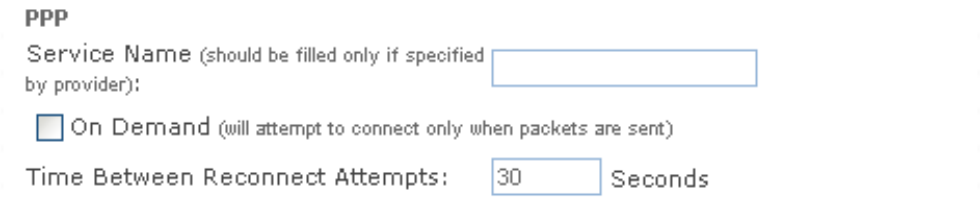

PPP
Service Name (should be filled only if specified by provider):
On Demand (will attempt to connect only when packets are sent)
Time Between Reconnect Attempts:
30
Seconds

Figure 8.143. PPP Configuration

PPP Authentication Point-to-Point Protocol (PPP) currently supports four authentication protocols: Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP), and Microsoft CHAP version 1 and 2. This section allows you to select the authentication protocols your gateway may use when negotiating with a PPTP server. Select all the protocols if no information is available about the server's authentication protocols. Please note that encryption is performed only if 'Microsoft CHAP', 'Microsoft CHAP version 2', or both are selected.

Figure 8.144. PPP Authentication

Login User Name As agreed with ISP.

Login Password As agreed with ISP.

Support Unencrypted Password (PAP) Password Authentication Protocol (PAP) is a simple, plain-text authentication scheme. The user name and password are requested by your networking peer in plain-text. PAP, however, is not a secure authentication protocol. Man-in-the-middle attacks can easily determine the remote access client's password. PAP offers no protection against replay attacks, remote client impersonation, or remote server impersonation.

Support Challenge Handshake Authentication (CHAP) The Challenge Handshake Authentication Protocol (CHAP) is a challenge-response authentication protocol that uses MD5 to hash the response to a challenge. CHAP protects against replay attacks by using an arbitrary challenge string per authentication attempt.

Support Microsoft CHAP Select this check box if you are communicating with a peer that uses Microsoft CHAP authentication protocol.

Support Microsoft CHAP Version 2 Select this check box if you are communicating with a peer that uses Microsoft CHAP Version 2 authentication protocol.

PPP Encryption PPP supports encryption facilities to secure the data across the network connection. A wide variety of encryption methods may be negotiated, although typically only one method is used in each direction of the link. This section allows you to select the encryption methods your gateway may use when negotiating with a PPTP server. Select all the methods if no information is available about the server's encryption methods. Please note that PPP encryption can only be used with MS-CHAP or MS-CHAP-V2 authentication protocols.

PPP Encryption
Require Encryption (Disconnect If Server Declines)
Support Encryption (40 Bit Keys)
Support Maximum Strength Encryption (128 Bit Keys)

Figure 8.145. PPP Encryption

Require Encryption Select this check box to ensure that the PPP connection is encrypted.

Support Encryption (40 Bit Keys) Select this check box if your peer supports 40 bit encryption keys.

Support Maximum Strength Encryption (128 Bit Keys) Select this check box if your peer supports 128 bit encryption keys.

PPP Compression The PPP Compression Control Protocol (CCP) is responsible for configuring, enabling, and disabling data compression algorithms on both ends of the point-to-point link. It is also used to signal a failure of the compression/ decompression mechanism in a reliable manner.

Figure 8.146. PPP Compression

For each compression algorithm, select one of the following from the drop down menu:

Reject Reject PPP connections with peers that use the compression algorithm.

Allow Allow PPP connections with peers that use the compression algorithm.

Require Ensure a connection with a peer is using the compression algorithm.

8.4.8.6. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

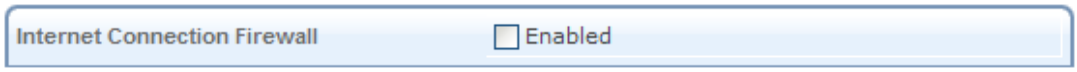


Figure 8.147. Internet Connection Firewall

Internet Connection Fastpath Select this check box to utilize the *Fastpath* algorithm for enhancing packet flow, resulting in faster communication between the LAN and the WAN. By default, this feature is enabled.

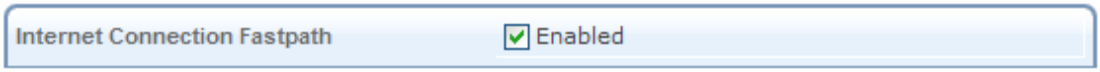


Figure 8.148. Internet Connection Fastpath

8.4.9. Ethernet Connection

The Ethernet connection wizard utility is one of the three methods used to configure the physical WAN Ethernet connection, described in section Section 8.4.7 . It is the most basic method, intended for connections that do not require user name and password in order to connect to the Internet. To configure a new Ethernet connection, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.11).

2. Select the Internet Connection radio button and click Next. The 'Internet Connection' screen will appear (see figure Figure 8.12).

1. Select the External Cable Modem radio button and click Next. The 'Internet Cable Modem Connection' screen will appear (see figure Figure 8.149).

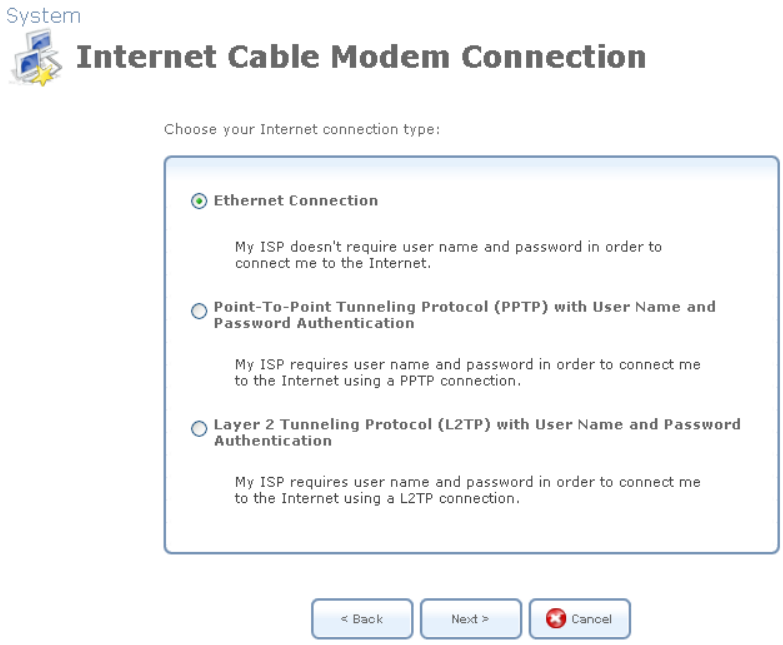

System
Internet Cable Modem Connection
Choose your Internet connection type:
Ethernet Connection
My ISP doesn't require user name and password in order to connect me to the Internet.
Point-To-Point Tunneling Protocol (PPTP) with User Name and Password Authentication
My ISP requires user name and password in order to connect me to the Internet using a PPTP connection.
Layer 2 Tunneling Protocol (L2TP) with User Name and Password Authentication
My ISP requires user name and password in order to connect me to the Internet using a L2TP connection.
< Back
Next >
Cancel

Figure 8.149. Internet Cable Modem Connection

2. Select the 'Ethernet Connection' radio button and click Next. The 'Connection Summary' screen will appear (see figure Figure 8.150).

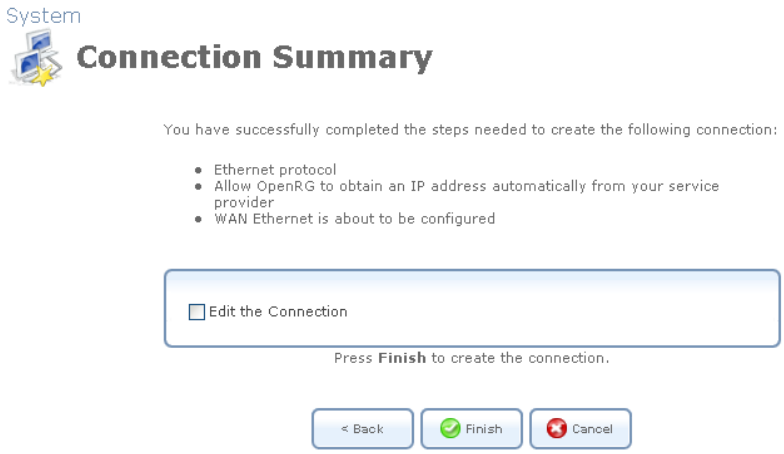

System
Connection Summary
You have successfully completed the steps needed to create the following connection:
Ethernet protocol
Allow OpenRG to obtain an IP address automatically from your service provider
WAN Ethernet is about to be configured
Edit the Connection
Press Finish to create the connection.
< Back
Finish
Cancel

Figure 8.150. Connection Summary

3. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

4. Click Finish to save the settings.

The WAN Ethernet connection will be configured accordingly. Please refer to section Section 8.4.7 to learn how to view and edit the connection's settings.

8.4.10. Layer 2 Tunneling Protocol (L2TP)

Layer 2 Tunneling Protocol (L2TP) is an extension to the PPP protocol, enabling your gateway to create VPN connections. Derived from Microsoft's Point-to-Point Tunneling Protocol (PPTP) and Cisco's Layer 2 Forwarding (L2F) technology, L2TP encapsulates PPP frames into IP packets either at the remote user's PC or at an ISP that

has an L2TP Remote Access Concentrator (LAC). The LAC transmits the L2TP packets over the network to the L2TP Network Server (LNS) at the corporate side. With OpenRG, L2TP is targeted at serving two purposes:

1. Connecting OpenRG to the Internet when it is used as a cable modem, or when using an external cable modem. Such a connection is established using user name and password authentication.

2. Connecting OpenRG to a remote network using a Virtual Private Network (VPN) tunnel over the Internet. This enables secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates, and user name and password for authentication.

8.4.10.1. Creating an L2TP connection with the Connection Wizard

To create a new L2TP connection, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.11).

2. Select the Internet Connection radio button and click Next. The 'Internet Connection' screen will appear (see figure Figure 8.12).

1. Select the External Cable Modem radio button (this option is for both internal and external cable modems) and click Next. The 'Internet Cable Modem Connection' screen will appear (see figure Figure 8.151).

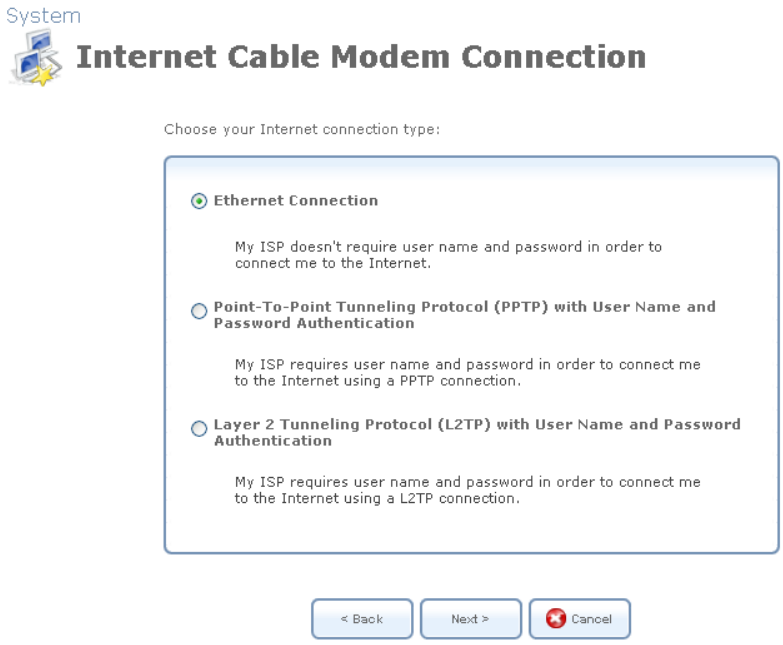

System
Internet Cable Modem Connection
Choose your Internet connection type:
Ethernet Connection
My ISP doesn't require user name and password in order to connect me to the Internet.
Point-To-Point Tunneling Protocol (PPTP) with User Name and Password Authentication
My ISP requires user name and password in order to connect me to the Internet using a PPTP connection.
Layer 2 Tunneling Protocol (L2TP) with User Name and Password Authentication
My ISP requires user name and password in order to connect me to the Internet using a L2TP connection.
< Back
Next >
Cancel

Figure 8.151. Internet Cable Modem Connection

2. Select the 'Layer 2 Tunneling Protocol (L2TP) with User Name and Password Authentication' radio button and click Next. The 'Layer 2 Tunneling Protocol (L2TP)' screen will appear (see figure Figure 8.152).

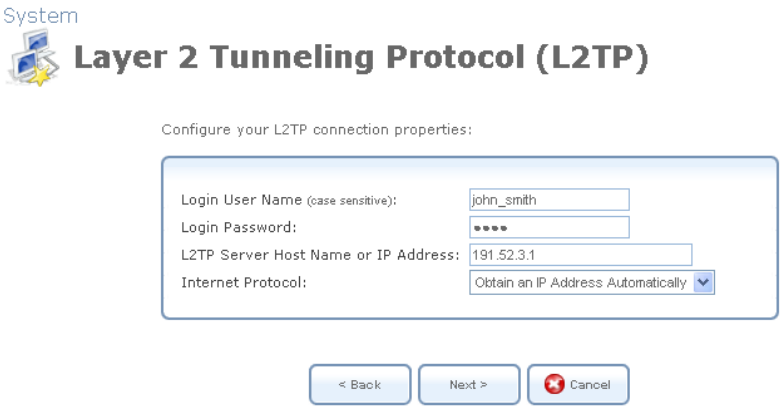


Figure 8.152. Layer 2 Tunneling Protocol (L2TP)

3. Enter the username and password provided by your Internet Service Provider (ISP).
4. Enter the L2TP server host name or IP address provided by your ISP.
5. Select whether to obtain an IP address automatically or specify one. This option is described in great detail in section Internet Protocol of this chapter.
6. Click Next. The 'Connection Summary' screen will appear (see figure Figure 8.153).

System
Connection Summary
You have successfully completed the steps needed to create the following connection:
Layer 2 Tunneling Protocol to 191.52.3.1 server
User Name: john_smith
Edit the Newly Created Connection
Press Finish to create the connection.
< Back
Finish
Cancel

Figure 8.153. Connection Summary

7. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.
8. Click Finish to save the settings.

The new L2TP connection will be added to the network connections list, and will be configurable like any other connection.

8.4.10.2. Creating an L2TP IPSec VPN connection with the Connection Wizard

To create a new L2TP IPSec VPN connection, perform the following steps:

1. Click the 'New Connection' link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen appears (see figure Figure 8.11).

2. Select the 'Connect to a Virtual Private Network over the Internet' radio button and click 'Next'. The 'Connect to a Virtual Private Network over the Internet' screen appears (see figure 'Connect to a Virtual Private Network over the Internet').

1. Select the 'VPN Client or Point-To-Point' radio button and click Next. The 'VPN Client or Point-To-Point' screen will appear (see figure Figure 8.154).

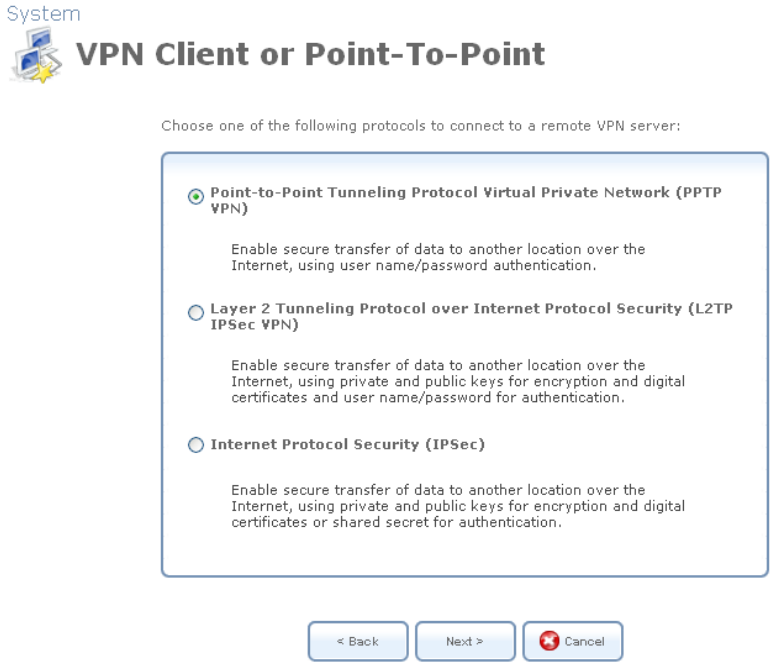

System
VPN Client or Point-To-Point
Choose one of the following protocols to connect to a remote VPN server:
Point-to-Point Tunneling Protocol Virtual Private Network (PPTP VPN)
Enable secure transfer of data to another location over the Internet, using user name/password authentication.
Layer 2 Tunneling Protocol over Internet Protocol Security (L2TP IPSec VPN)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates and user name/password for authentication.
Internet Protocol Security (IPSec)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates or shared secret for authentication.
< Back
Next >
Cancel

Figure 8.154. VPN Client or Point-To-Point

2. Select the 'Layer 2 Tunneling Protocol over Internet Protocol Security (L2TP IPSec VPN)' radio button and click Next. The 'Layer 2 Tunneling Protocol over Internet Protocol Security (L2TP IPSec VPN)' screen will appear (see figure Figure 8.155).

Figure 8.155. Layer 2 Tunneling Protocol over Internet Protocol Security (L2TP IPSec VPN)

3. Enter the username and password provided by the administrator of the network you are trying to access.

4. Enter the IPSec shared secret, which is the encryption key jointly decided upon with the network you are trying to access.

5. Enter the remote tunnel endpoint address. This would be the IP address or domain name of the remote network computer, which serves as the tunnel's endpoint.

6. Click Next. The 'Connection Summary' screen will appear (see figure Figure 8.156).

System
Connection Summary
You have successfully completed the steps needed to create the following connection:
Layer 2 Tunneling Protocol to 191.52.3.1 VPN server
User Name: john_smith
Edit the Newly Created Connection
Press Finish to create the connection.
< Back
Finish
Cancel

Figure 8.156. Connection Summary

7. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

8. Click Finish to save the settings.

The new L2TP IPSec VPN connection will be added to the network connections list, and will be configurable like any other connection.

8.4.10.3. General

To view and edit the L2TP connection settings, click the 'L2TP' link in the 'Network Connections' screen (see figure Figure 8.10). The 'L2TP Properties' screen will appear (see figure Figure 8.157), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

Figure 8.157. L2TP Properties

8.4.10.4. Settings

General This section displays the connection's general parameters.

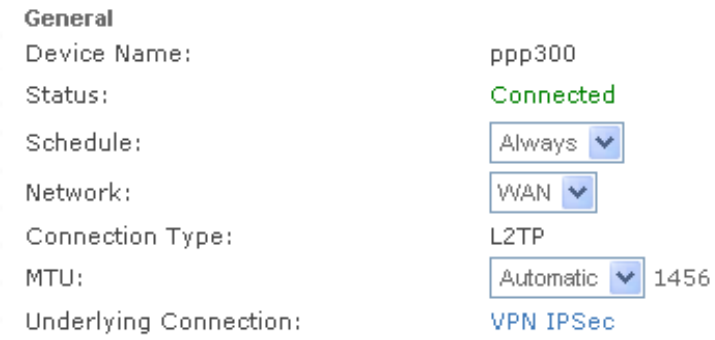


Figure 8.158. General L2TP Settings

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

Internet Protocol Select one of the following Internet protocol options from the 'Internet Protocol' combo-box:

- Obtain an IP Address Automatically
- Use the Following IP Address

Please note that the screen will refresh to display relevant configuration settings according to your choice.

Obtain an IP Address Automatically Your connection is configured by default to obtain an IP automatically. You should change this configuration in case your service provider requires it. The server that assigns the gateway with an IP address, also assigns a subnet mask. You can override the dynamically assigned subnet mask by selecting the 'Override Subnet Mask' and specifying your own mask instead.

Figure 8.159. Internet Protocol -- Automatic IP

Use the Following IP Address Your connection can be configured using a permanent (static) IP address. Your service provider should provide you with such an IP address and subnet mask.

Figure 8.160. Internet Protocol -- Static IP

DNS Server Domain Name System (DNS) is the method by which Web site domain names are translated into IP addresses. You can configure the connection to automatically obtain a DNS server address, or specify such an address manually, according to the information provided by your ISP. To configure the connection to automatically obtain a DNS server address, select 'Obtain DNS Server Address Automatically' from the 'DNS Server' drop down menu.

Figure 8.161. DNS Server -- Automatic IP

To manually configure DNS server addresses, select 'Use the Following DNS Server Addresses' from the 'DNS Server' drop down menu (see figure 'DNS Server -- Static IP'). Specify up to two different DNS server address, one primary, another secondary.

Figure 8.162. DNS Server -- Static IP

To learn more about this feature, turn to chapter Section 7.13.1 .

8.4.10.5. Routing

You can choose to setup your gateway to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Routing Mode Select one of the following routing modes:

Route Use route mode if you want your gateway to function as a router between two networks.

NAPT Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.

Device Metric The device metric is a value used by the gateway to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.

Default Route Select this check box to define this device as a the default route.

Routing Information Protocol (RIP) Select this check box to enable the Routing Information Protocol (RIP). RIP determines a route based on the smallest hop count between source and destination. When RIP is enabled, select the following:

- Listen to RIP messages - select 'None', 'RIPv1', 'RIPv2' or 'RIPv1/2'.
- Send RIP messages - select 'None', 'RIPv1', 'RIPv2-broadcast' or 'RIPv2-multicast'.

Multicast - IGMP Proxy Internal IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups. Select the 'Multicast IGMP Proxy Internal' check-box to enable this feature.

IGMP Query Version OpenRG supports all three versions of IGMP. Select the version you would like to use.

Routing Table Allows you to add or modify routes when this device is active. Use the 'New Route' button to add a route or edit existing routes.

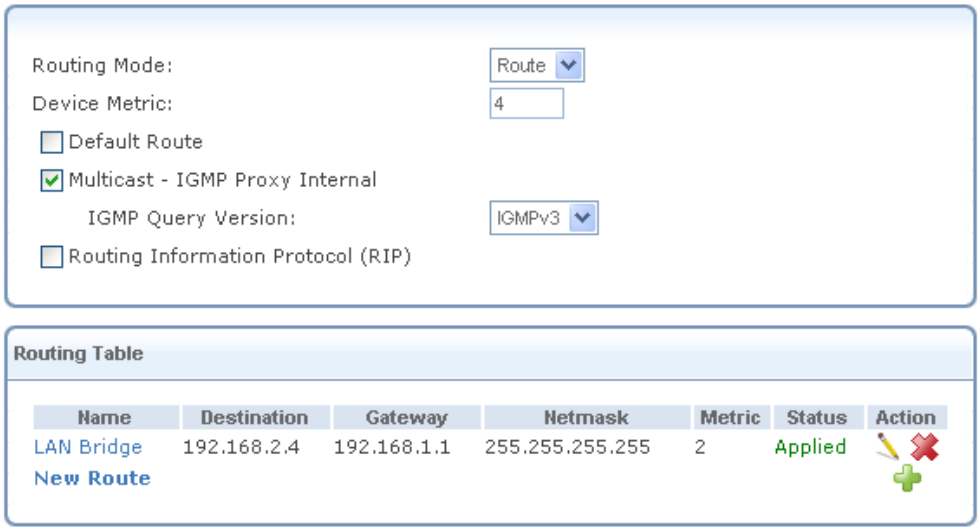


Figure 8.163. Advanced Routing Properties

To learn more about this feature, please refer to chapter Section 8.6.1 .

8.4.10.6. PPP

PPP
Point-to-Point Protocol (PPP) is the most popular method for transporting packets between the user and the Internet service provider. PPP supports authentication protocols such as PAP and CHAP, as well as other compression and encryption protocols.

PPP-on-Demand Use PPP on demand to initiate the point-to-point protocol session only when packets are actually sent over the Internet.

Time Between Reconnect Attempts Specify the duration between PPP reconnected attempts, as provided by your ISP.

Figure 8.164. PPP Configuration

PPP Authentication Point-to-Point Protocol (PPP) currently supports four authentication protocols: Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP), and Microsoft CHAP version 1 and 2. This section allows you to select the authentication protocols your gateway may use when negotiating with a PPTP server. Select all the protocols if no information is available about the server's authentication protocols. Please note that encryption is performed only if 'Microsoft CHAP', 'Microsoft CHAP version 2', or both are selected.

Figure 8.165. PPP Authentication

Login User Name As agreed with ISP.

Login Password As agreed with ISP.

Support Unencrypted Password (PAP) Password Authentication Protocol (PAP) is a simple, plain-text authentication scheme. The user name and password are requested by your networking peer in plain-text. PAP, however, is not a secure authentication protocol. Man-in-the-middle attacks can easily determine the remote access client's password. PAP offers no protection against replay attacks, remote client impersonation, or remote server impersonation.

Support Challenge Handshake Authentication (CHAP) The Challenge Handshake Authentication Protocol (CHAP) is a challenge-response authentication protocol that uses MD5 to hash the response to a challenge. CHAP protects against replay attacks by using an arbitrary challenge string per authentication attempt.

Support Microsoft CHAP Select this check box if you are communicating with a peer that uses Microsoft CHAP authentication protocol.

Support Microsoft CHAP Version 2 Select this check box if you are communicating with a peer that uses Microsoft CHAP Version 2 authentication protocol.

PPP Encryption PPP supports encryption facilities to secure the data across the network connection. A wide variety of encryption methods may be negotiated, although typically only one method is used in each direction of the link. This section allows you to select the encryption methods your gateway may use when negotiating with a PPTP server. Select all the methods if no information is available about the server's encryption methods. Please note that PPP encryption can only be used with MS-CHAP or MS-CHAP-V2 authentication protocols.

PPP Encryption
Require Encryption (Disconnect If Server Declines)
Support Encryption (40 Bit Keys)
Support Maximum Strength Encryption (128 Bit Keys)

Figure 8.166. PPP Encryption

Require Encryption Select this check box to ensure that the PPP connection is encrypted.

Support Encryption (40 Bit Keys) Select this check box if your peer supports 40 bit encryption keys.

Support Maximum Strength Encryption (128 Bit Keys) Select this check box if your peer supports 128 bit encryption keys.

8.4.10.7. L2TP

L2TP Define your ISP's server parameters.

- **L2TP Server Host Name or IP Address** Enter the connection's host name or IP address obtained from your ISP.
- **Shared Secret** Enter the shared secret value obtained from your ISP.

Figure 8.167. L2TP Configuration

8.4.10.8. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

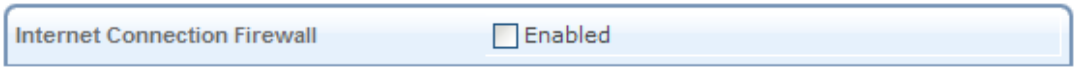


Figure 8.168. Internet Connection Firewall

8.4.11. Layer 2 Tunneling Protocol Server (L2TP Server)

OpenRG can act as a Layer 2 Tunneling Protocol Server (L2TP Server), accepting L2TP client connection requests. **Creation with the Connection Wizard** To create a new L2TP Server, perform the following steps:

1. Click the 'New Connection' link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen appears (see figure Figure 8.11).
2. Select the 'Connect to a Virtual Private Network over the Internet' radio button and click 'Next'. The 'Connect to a Virtual Private Network over the Internet' screen appears (see figure 'Connect to a Virtual Private Network over the Internet').
1. Select the VPN Server radio button and click Next. The 'VPN Server' screen will appear (see figure Figure 8.169).

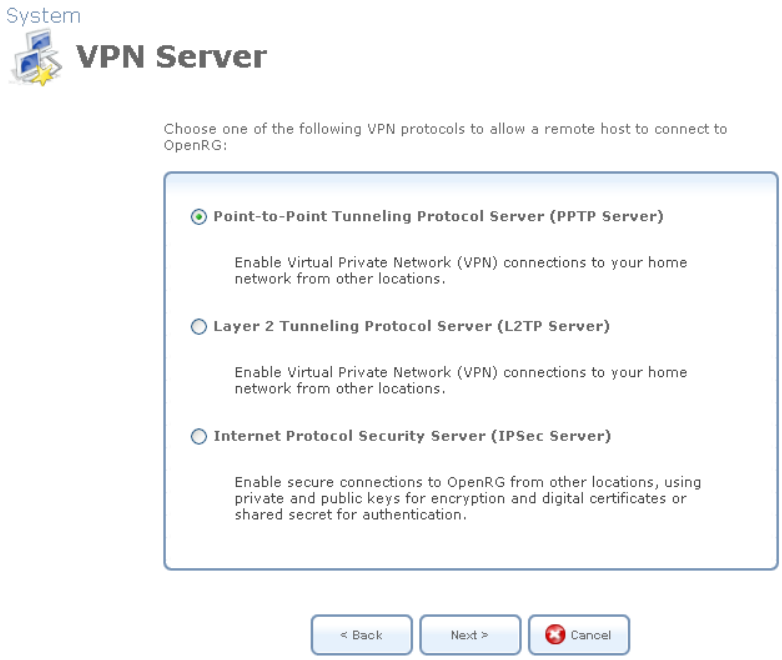

System
VPN Server
Choose one of the following VPN protocols to allow a remote host to connect to OpenRG:
Point-to-Point Tunneling Protocol Server (PPTP Server)
Enable Virtual Private Network (VPN) connections to your home network from other locations.
Layer 2 Tunneling Protocol Server (L2TP Server)
Enable Virtual Private Network (VPN) connections to your home network from other locations.
Internet Protocol Security Server (IPSec Server)
Enable secure connections to OpenRG from other locations, using private and public keys for encryption and digital certificates or shared secret for authentication.
< Back
Next >
Cancel

Figure 8.169. VPN Server

2. Select the 'Layer 2 Tunneling Protocol Server (L2TP Server)' radio button and click Next. The 'Layer 2 Tunneling Protocol (L2TP)' screen appears:

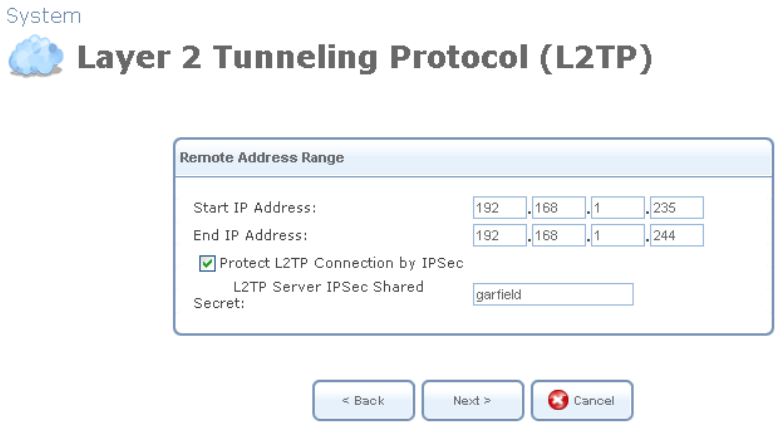

System
Layer 2 Tunneling Protocol (L2TP)
Remote Address Range
Start IP Address: 192 . 168 . 1 . 235
End IP Address: 192 . 168 . 1 . 244
Protect L2TP Connection by IPSec
L2TP Server IPSec Shared Secret: garfield
< Back
Next >
Cancel

Figure 8.170. Layer 2 Tunneling Protocol (L2TP)

3. In this screen, perform the following:

    1. Specify the address range that OpenRG will reserve for remote users. You may use the default values as depicted in figure Figure 8.170 .

    2. By default, the L2TP connection is protected by the IP Security (IPSec) protocol (the option is checked). However, if you wish to keep this setting, you must provide a string that will server as the 'L2TP Server IPSec Shared Secret'. Alternatively, uncheck this option to disable L2TP protection by IPSec.

4. Click Next. The 'Connection Summary' screen appears (see figure Figure 8.171). Note the attention message alerting that there are no users with VPN permissions.

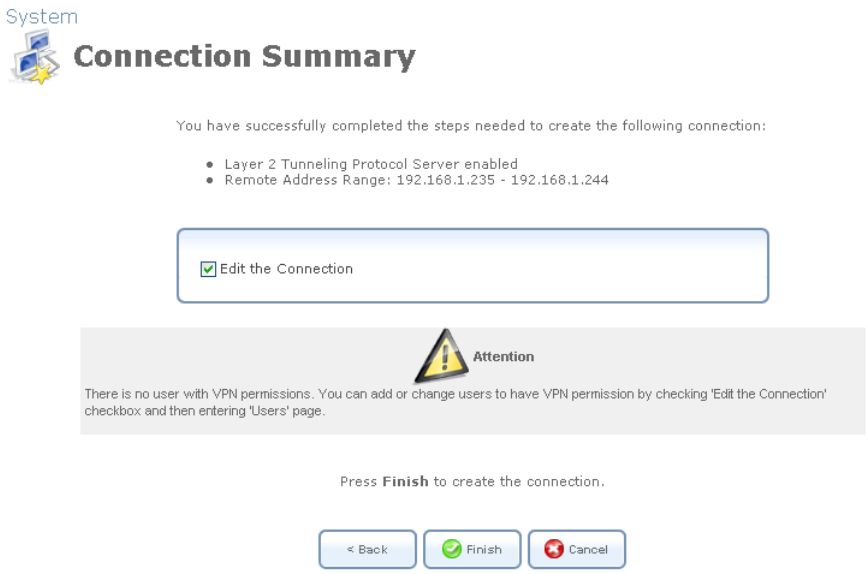

System
Connection Summary
You have successfully completed the steps needed to create the following connection:
Layer 2 Tunneling Protocol Server enabled
Remote Address Range: 192.168.1.235 - 192.168.1.244
Edit the Connection
Attention
There is no user with VPN permissions. You can add or change users to have VPN permission by checking 'Edit the Connection' checkbox and then entering 'Users' page.
Press Finish to create the connection.
< Back
Finish
Cancel

Figure 8.171. Connection Summary

5. Check the 'Edit the Connection' check box and click Finish. The 'Layer 2 Tunneling Protocol Server (L2TP Server)' screen appears:

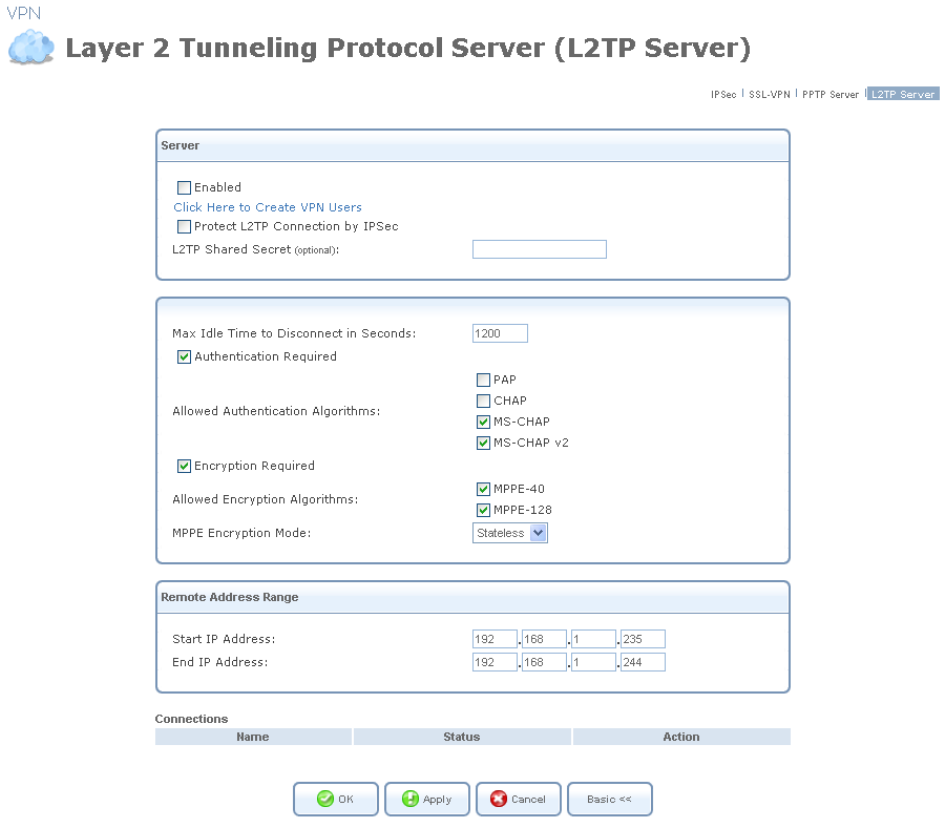


Figure 8.172. Advanced L2TP Server Parameters

6. Click the 'Click Here to Create VPN Users' link to define remote users that will be granted access to your home network. Refer to Section 8.3 to learn how to define and configure users.

7. Click 'OK' to save the settings.

The new L2TP Server will be added to the network connections list, and will be configurable like any connection. Unlike other connections, it is also accessible via the OpenRG's 'Advanced' screen. Note that the connection wizard automatically creates a default IPSec connection in order to protect the L2TP connection. To learn more, please refer to section Section 7.10.4 .

8.4.12. Point-to-Point Tunneling Protocol (PPTP)

Point-to-Point Tunneling Protocol (PPTP) is a protocol developed by Microsoft targeted at creating VPN connections over the Internet. This enables remote users to access the gateway via any ISP that supports PPTP on its servers. PPTP encapsulates network traffic, encrypts content using Microsoft's Point-to-Point Encryption (MPPE) protocol that is based on RC4, and routes using the generic routing encapsulation (GRE) protocol. With OpenRG, PPTP is targeted at serving two purposes:

1. Connecting OpenRG to the Internet when it is used as a cable modem, or when using an external cable modem. Such a connection is established using user name and password authentication.

2. Connecting OpenRG to a remote network using a Virtual Private Network (VPN) tunnel over the Internet. This enables secure transfer of data to another location over the Internet, using user name and password authentication.

8.4.12.1. Creating a PPTP connection with the Connection Wizard

To create a new PPTP connection, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.11).

2. Select the Internet Connection radio button and click Next. The 'Internet Connection' screen will appear (see figure Figure 8.12).

1. Select the External Cable Modem radio button (this option is for both internal and external cable modems) and click Next. The 'Internet Cable Modem Connection' screen appears:

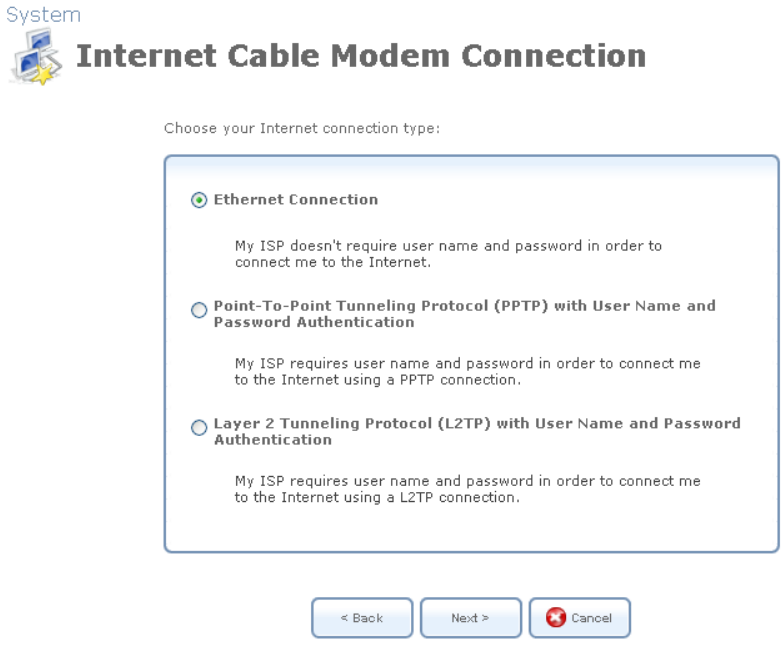

System
Internet Cable Modem Connection
Choose your Internet connection type:
Ethernet Connection
My ISP doesn't require user name and password in order to connect me to the Internet.
Point-To-Point Tunneling Protocol (PPTP) with User Name and Password Authentication
My ISP requires user name and password in order to connect me to the Internet using a PPTP connection.
Layer 2 Tunneling Protocol (L2TP) with User Name and Password Authentication
My ISP requires user name and password in order to connect me to the Internet using a L2TP connection.
< Back
Next >
Cancel

Figure 8.173. Internet Cable Modem Connection

2. Select the 'Point-To-Point Tunneling Protocol (PPTP) with User Name and Password Authentication' radio button and click Next. The 'Point-to-Point Tunneling Protocol (PPTP)' screen will appear (see figure Figure 8.174).

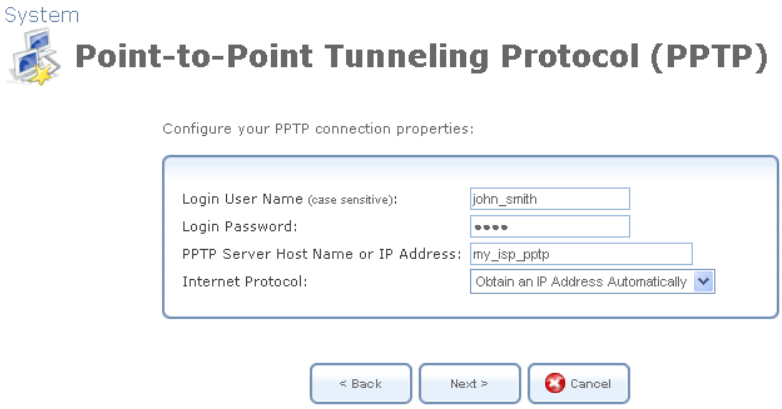


Figure 8.174. Point-to-Point Tunneling Protocol

3. Enter the username and password provided by your Internet Service Provider (ISP).

4. Enter the PPTP server host name or IP address provided by your ISP.

5. Select whether to obtain an IP address automatically or specify one. This option is described in great detail in section Internet Protocol of this chapter.

6. Click Next. The 'Connection Summary' screen will appear (see figure Figure 8.175).

Figure 8.175. Connection Summary

7. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

8. Click Finish to save the settings.

The new PPTP connection will be added to the network connections list, and will be configurable like any other connection.

8.4.12.2. Creating a PPTP VPN connection with the Connection Wizard

To create a new PPTP VPN connection, perform the following steps:

1. Click the 'New Connection' link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen appears (see figure Figure 8.11).

2. Select the 'Connect to a Virtual Private Network over the Internet' radio button and click 'Next'. The 'Connect to a Virtual Private Network over the Internet' screen appears (see figure 'Connect to a Virtual Private Network over the Internet').

1. Select the 'VPN Client or Point-To-Point' radio button and click Next. The 'VPN Client or Point-To-Point' screen will appear (see figure Figure 8.176).

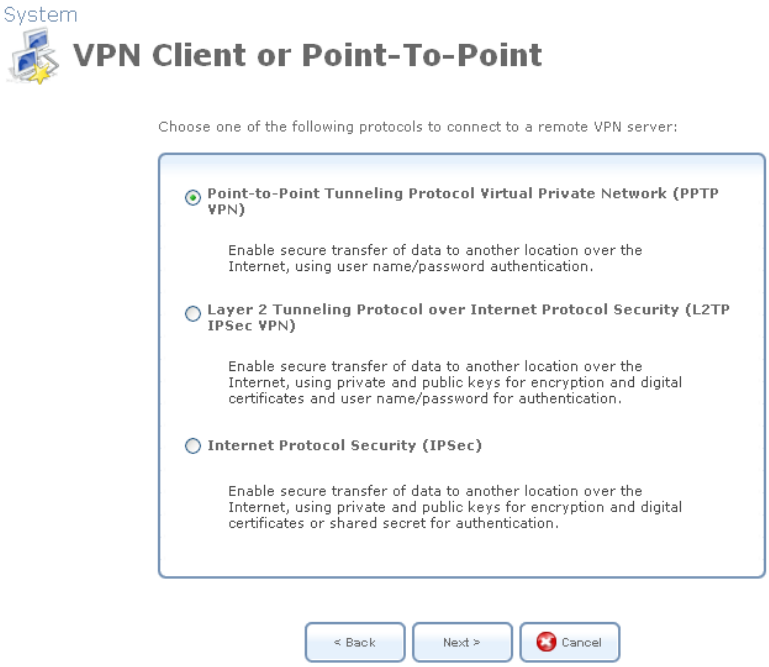

System
VPN Client or Point-To-Point
Choose one of the following protocols to connect to a remote VPN server:
Point-to-Point Tunneling Protocol Virtual Private Network (PPTP VPN)
Enable secure transfer of data to another location over the Internet, using user name/password authentication.
Layer 2 Tunneling Protocol over Internet Protocol Security (L2TP IPSec VPN)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates and user name/password for authentication.
Internet Protocol Security (IPSec)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates or shared secret for authentication.
< Back
Next >
Cancel

Figure 8.176. VPN Client or Point-To-Point

2. Select the 'Point-to-Point Tunneling Protocol Virtual Private Network (PPTP VPN)' radio button and click Next. The 'Point-to-Point Tunneling Protocol Virtual Private Network (PPTP VPN)' screen will appear (see figure Figure 8.177).

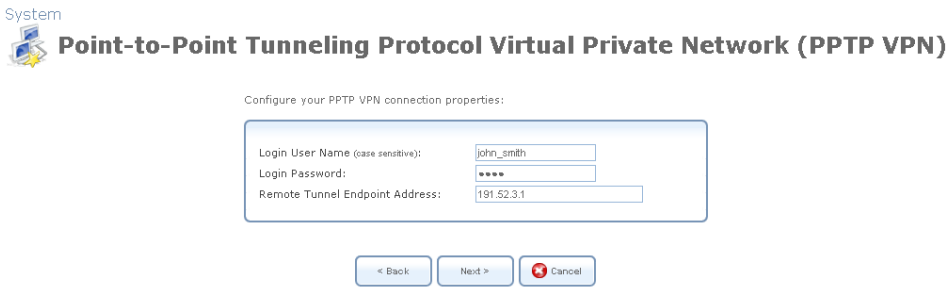


Figure 8.177. Point-to-Point Tunneling Protocol Virtual Private Network (PPTP VPN)

3. Enter the username and password provided by the administrator of the network you are trying to access.

4. Enter the remote tunnel endpoint address. This would be the IP address or domain name of the remote network computer, which serves as the tunnel's endpoint.

5. Click Next. The 'Connection Summary' screen will appear (see figure Figure 8.178).

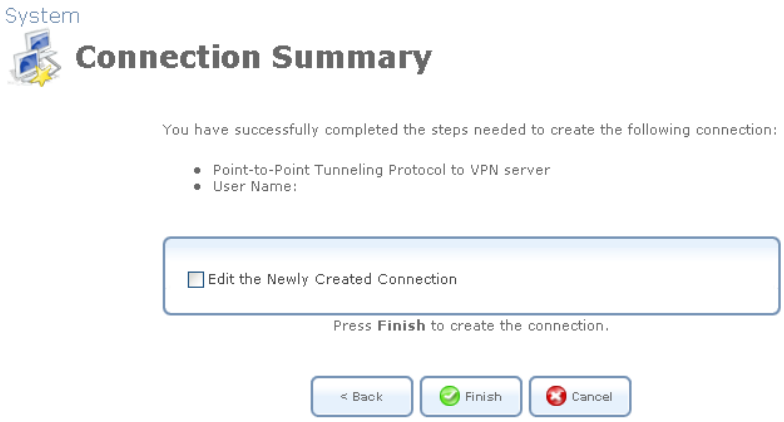


Figure 8.178. Connection Summary

6. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

7. Click Finish to save the settings.

The new PPTP VPN connection will be added to the network connections list, and will be configurable like any other connection.

8.4.12.3. General

To view and edit the PPTP connection settings, click the 'PPTP' link in the 'Network Connections' screen (see figure Figure 8.10). The 'PPTP Properties' screen will appear (see figure Figure 8.179), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

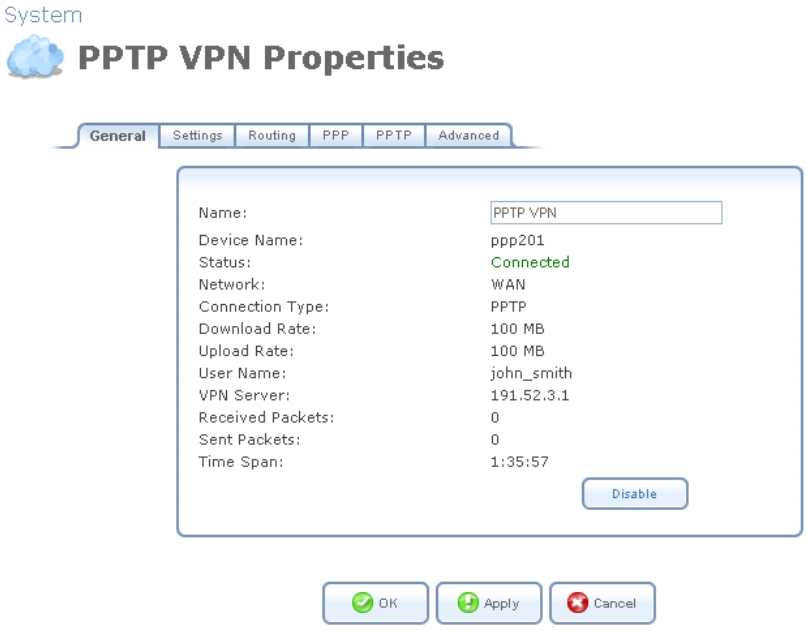


Figure 8.179. PPTP Properties

8.4.12.4. Settings

General This section displays the connection's general parameters.

Figure 8.180. General PPTP Settings

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

Internet Protocol Select one of the following Internet protocol options from the 'Internet Protocol' combo-box:

- Obtain an IP Address Automatically
- Use the Following IP Address

Please note that the screen will refresh to display relevant configuration settings according to your choice.

Obtain an IP Address Automatically Your connection is configured by default to obtain an IP automatically. You should change this configuration in case your service provider requires it. The server that assigns the gateway with an IP address, also assigns a subnet mask. You can override the dynamically assigned subnet mask by selecting the 'Override Subnet Mask' and specifying your own mask instead.

Figure 8.181. Internet Protocol -- Automatic IP

Use the Following IP Address Your connection can be configured using a permanent (static) IP address. Your service provider should provide you with such an IP address and subnet mask.

Figure 8.182. Internet Protocol -- Static IP

DNS Server Domain Name System (DNS) is the method by which Web site domain names are translated into IP addresses. You can configure the connection to automatically obtain a DNS server address, or specify such an address manually, according to the information provided by your ISP. To configure the connection to automatically obtain a DNS server address, select 'Obtain DNS Server Address Automatically' from the 'DNS Server' drop down menu.

Figure 8.183. DNS Server -- Automatic IP

To manually configure DNS server addresses, select 'Use the Following DNS Server Addresses' from the 'DNS Server' drop down menu (see figure 'DNS Server -- Static IP'). Specify up to two different DNS server address, one primary, another secondary.

Figure 8.184. DNS Server -- Static IP

To learn more about this feature, turn to chapter Section 7.13.1 .

8.4.12.5. Routing

You can choose to setup your gateway to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Routing Mode Select one of the following routing modes:

Route Use route mode if you want your gateway to function as a router between two networks.

NAPT Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.

Device Metric The device metric is a value used by the gateway to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.

Default Route Select this check box to define this device as a the default route.

Routing Information Protocol (RIP) Select this check box to enable the Routing Information Protocol (RIP). RIP determines a route based on the smallest hop count between source and destination. When RIP is enabled, select the following:

- Listen to RIP messages - select 'None', 'RIPv1', 'RIPv2' or 'RIPv1/2'.
- Send RIP messages - select 'None', 'RIPv1', 'RIPv2-broadcast' or 'RIPv2-multicast'.

Multicast - IGMP Proxy Internal IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups. Select the 'Multicast IGMP Proxy Internal' check-box to enable this feature.

IGMP Query Version OpenRG supports all three versions of IGMP. Select the version you would like to use.

Routing Table Allows you to add or modify routes when this device is active. Use the 'New Route' button to add a route or edit existing routes.

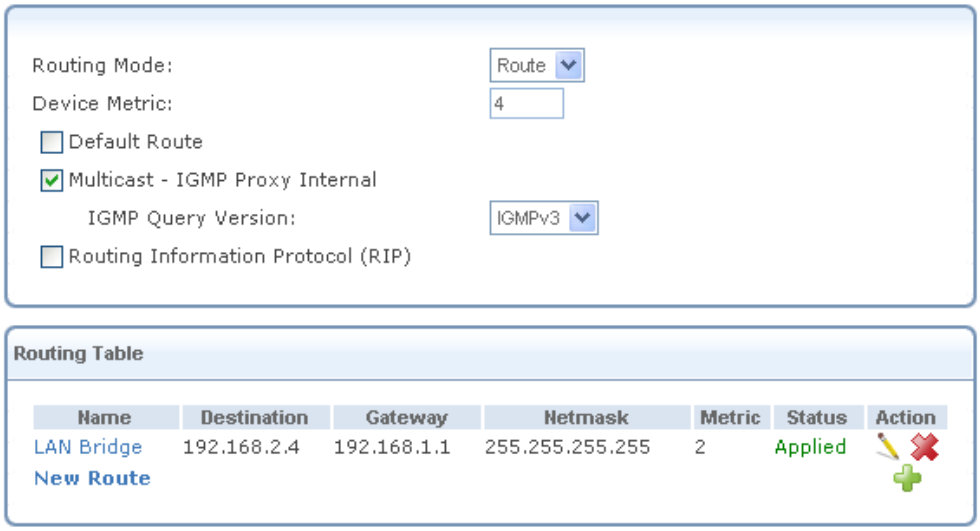


Figure 8.185. Advanced Routing Properties

To learn more about this feature, please refer to chapter Section 8.6.1 .

8.4.12.6. PPP

PPP
Point-to-Point Protocol (PPP) is the most popular method for transporting packets between the user and the Internet service provider. PPP supports authentication protocols such as PAP and CHAP, as well as other compression and encryption protocols.

PPP-on-Demand Use PPP on demand to initiate the point-to-point protocol session only when packets are actually sent over the Internet.

Time Between Reconnect Attempts Specify the duration between PPP reconnected attempts, as provided by your ISP.

Figure 8.186. PPP Configuration

PPP Authentication Point-to-Point Protocol (PPP) currently supports four authentication protocols: Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP), and Microsoft CHAP version 1 and 2. This section allows you to select the authentication protocols your gateway may use when negotiating with a PPTP server. Select all the protocols if no information is available about the server's authentication protocols. Please note that encryption is performed only if 'Microsoft CHAP', 'Microsoft CHAP version 2', or both are selected.

Figure 8.187. PPP Authentication

Login User Name As agreed with ISP.

Login Password As agreed with ISP.

Support Unencrypted Password (PAP) Password Authentication Protocol (PAP) is a simple, plain-text authentication scheme. The user name and password are requested by your networking peer in plain-text. PAP, however, is not a secure authentication protocol. Man-in-the-middle attacks can easily determine the remote access client's password. PAP offers no protection against replay attacks, remote client impersonation, or remote server impersonation.

Support Challenge Handshake Authentication (CHAP) The Challenge Handshake Authentication Protocol (CHAP) is a challenge-response authentication protocol that uses MD5 to hash the response to a challenge. CHAP protects against replay attacks by using an arbitrary challenge string per authentication attempt.

Support Microsoft CHAP Select this check box if you are communicating with a peer that uses Microsoft CHAP authentication protocol.

Support Microsoft CHAP Version 2 Select this check box if you are communicating with a peer that uses Microsoft CHAP Version 2 authentication protocol.

PPP Encryption PPP supports encryption facilities to secure the data across the network connection. A wide variety of encryption methods may be negotiated, although typically only one method is used in each direction of the link. This section allows you to select the encryption methods your gateway may use when negotiating with a PPTP server. Select all the methods if no information is available about the server's encryption methods. Please note that PPP encryption can only be used with MS-CHAP or MS-CHAP-V2 authentication protocols.

PPP Encryption
Require Encryption (Disconnect If Server Declines)
Support Encryption (40 Bit Keys)
Support Maximum Strength Encryption (128 Bit Keys)

Figure 8.188. PPP Encryption

Require Encryption Select this check box to ensure that the PPP connection is encrypted.

Support Encryption (40 Bit Keys) Select this check box if your peer supports 40 bit encryption keys.

Support Maximum Strength Encryption (128 Bit Keys) Select this check box if your peer supports 128 bit encryption keys.

8.4.12.7. PPTP

PPTP Define your ISP's server parameters.

PPTP Server Host Name or IP Address Enter the connection's host name or IP address obtained from your ISP.

Figure 8.189. PPTP Configuration

8.4.12.8. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

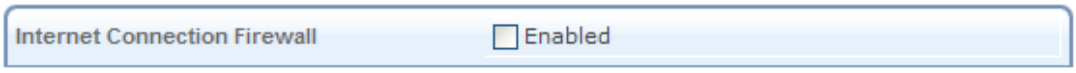


Figure 8.190. Internet Connection Firewall

8.4.13. Point-to-Point Tunneling Protocol Server (PPTP Server)

OpenRG can act as a Point-to-Point Tunneling Protocol Server (PPTP Server), accepting PPTP client connection requests. **Creation with the Connection Wizard** To create a new PPTP Server, perform the following steps:

1. Click the 'New Connection' link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen appears (see figure Figure 8.11).

2. Select the 'Connect to a Virtual Private Network over the Internet' radio button and click 'Next'. The 'Connect to a Virtual Private Network over the Internet' screen appears (see figure 'Connect to a Virtual Private Network over the Internet').

1. Select the VPN Server radio button and click Next. The 'VPN Server' screen appears:

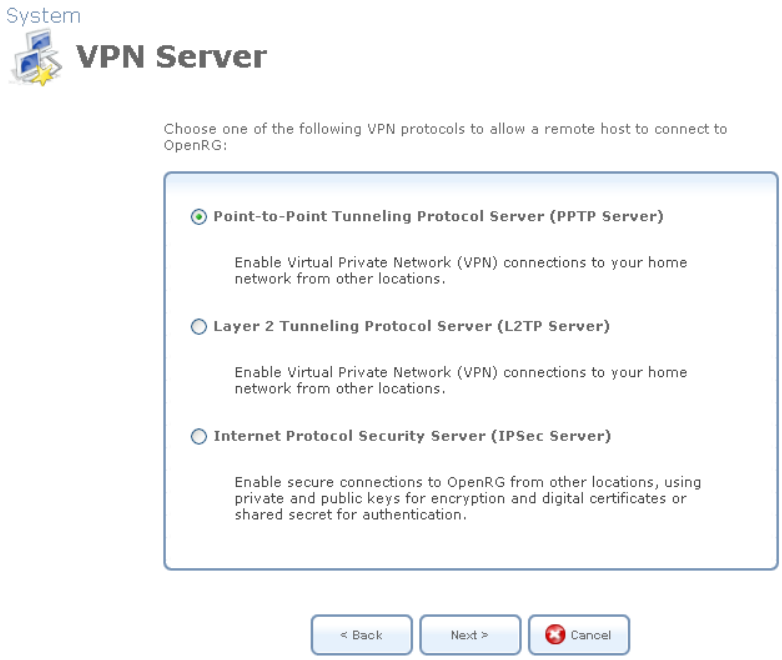

System
VPN Server
Choose one of the following VPN protocols to allow a remote host to connect to OpenRG:
Point-to-Point Tunneling Protocol Server (PPTP Server)
Enable Virtual Private Network (VPN) connections to your home network from other locations.
Layer 2 Tunneling Protocol Server (L2TP Server)
Enable Virtual Private Network (VPN) connections to your home network from other locations.
Internet Protocol Security Server (IPSec Server)
Enable secure connections to OpenRG from other locations, using private and public keys for encryption and digital certificates or shared secret for authentication.
< Back
Next >
Cancel

Figure 8.191. VPN Server

2. Select the 'Point-to-Point Tunneling Protocol Server (PPTP Server)' radio button and click Next. The 'Point-to-Point Tunneling Protocol (PPTP)' screen appears:

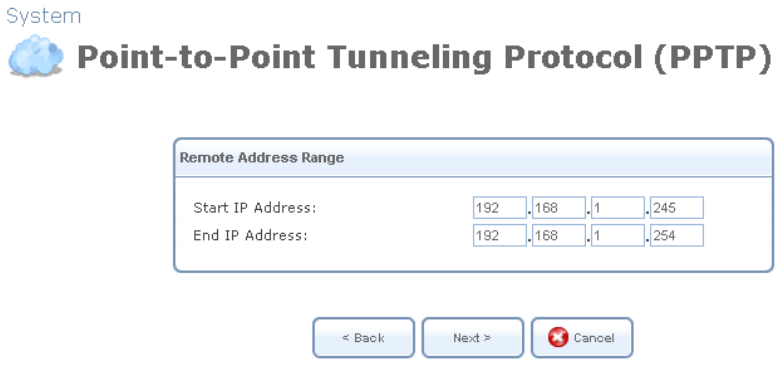

System
Point-to-Point Tunneling Protocol (PPTP)
Remote Address Range
Start IP Address: 192 . 168 . 1 . 245
End IP Address: 192 . 168 . 1 . 254
< Back
Next >
Cancel

Figure 8.192. Point-to-Point Tunneling Protocol (PPTP)

3. Specify the address range that OpenRG will reserve for remote users. You may use the default values as depicted in figure Figure 8.192 .

4. Click Next. The 'Connection Summary' screen appears (see figure Figure 8.193). Note the attention message alerting that there are no users with VPN permissions.

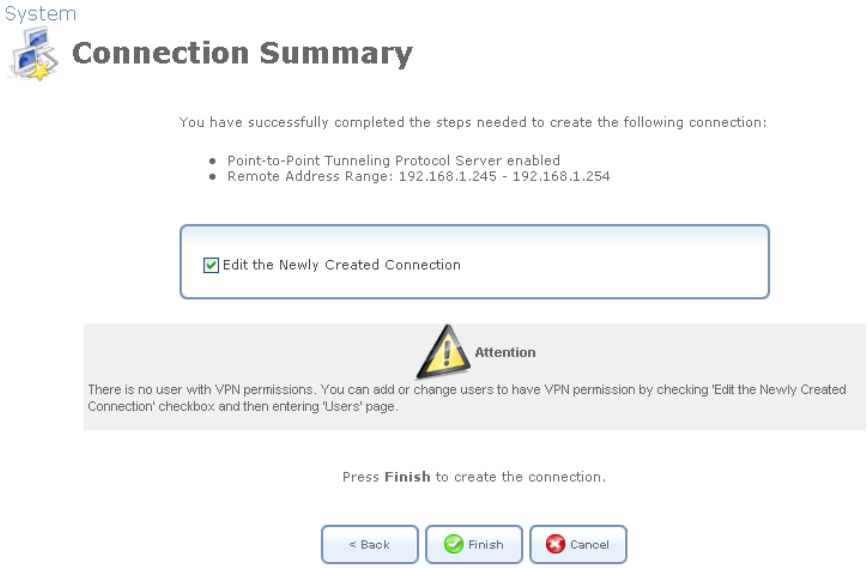

System
Connection Summary
You have successfully completed the steps needed to create the following connection:
Point-to-Point Tunneling Protocol Server enabled
Remote Address Range: 192.168.1.245 - 192.168.1.254
Edit the Newly Created Connection
Attention
There is no user with VPN permissions. You can add or change users to have VPN permission by checking 'Edit the Newly Created Connection' checkbox and then entering 'Users' page.
Press Finish to create the connection.
< Back
Finish
Cancel

Figure 8.193. Connection Summary

5. Check the 'Edit the Newly Created Connection' check box and click Finish. The 'Point-to-Point Tunneling Protocol Server (PPTP Server)' screen appears:

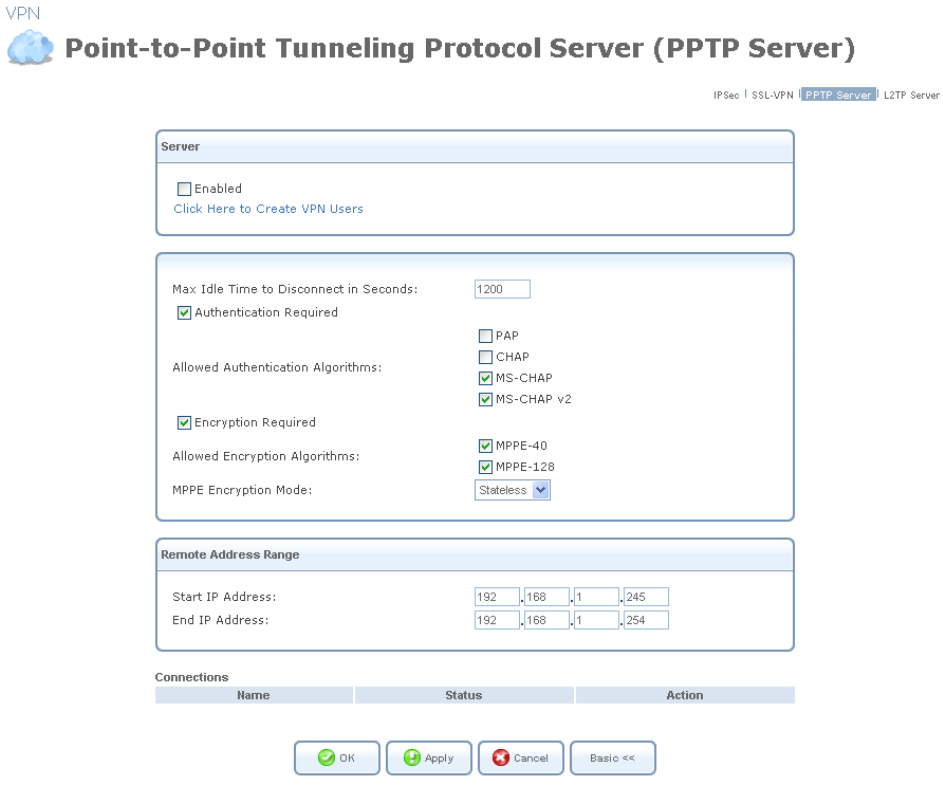


Figure 8.194. Advanced PPTP Server Parameters

6. Click the 'Click Here to Create VPN Users' link to define remote users that will be granted access to your home network. Refer to Section 8.3 to learn how to define and configure users.

7. Click 'OK' to save the settings.

The new PPTP Server will be added to the network connections list, and will be configurable like any connection. Unlike other connections, it is also accessible via the OpenRG's 'Advanced' screen. To learn more about the configuration of a PPTP server, please refer to section Section 7.10.3 .

8.4.14. Internet Protocol Security (IPSec)

Internet Protocol Security (IPSec) is a series of guidelines for the protection of Internet Protocol (IP) communications. It specifies procedures for securing private information transmitted over public networks.
Creation with the Connection Wizard To create a new IPSec connection, perform the following steps:

1. Click the 'New Connection' link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen appears (see figure Figure 8.11).

2. Select the 'Connect to a Virtual Private Network over the Internet' radio button and click 'Next'. The 'Connect to a Virtual Private Network over the Internet' screen appears (see figure 'Connect to a Virtual Private Network over the Internet').

3. Select the 'VPN Client or Point-To-Point' radio button and click 'Next'. The 'VPN Client or Point-To-Point' screen appears.

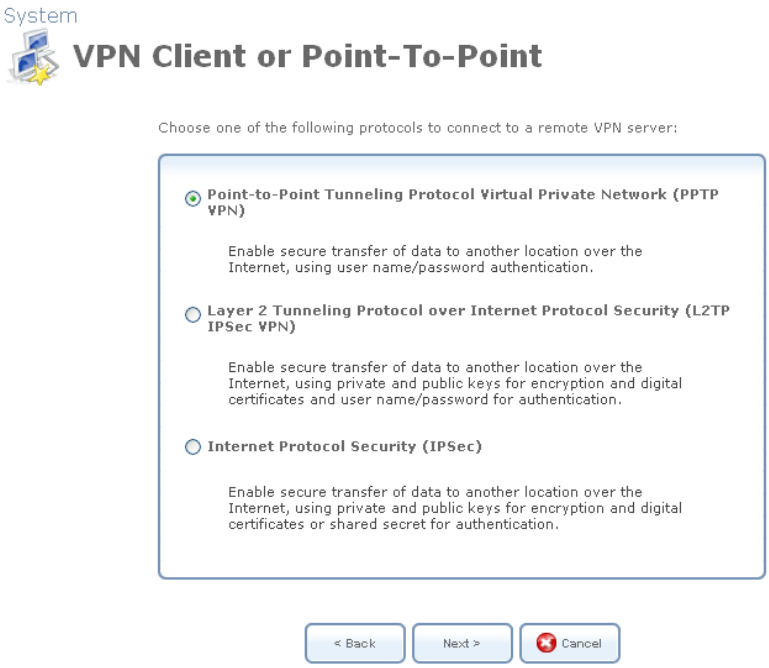

System
VPN Client or Point-To-Point
Choose one of the following protocols to connect to a remote VPN server:
Point-to-Point Tunneling Protocol Virtual Private Network (PPTP VPN)
Enable secure transfer of data to another location over the Internet, using user name/password authentication.
Layer 2 Tunneling Protocol over Internet Protocol Security (L2TP IPSec VPN)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates and user name/password for authentication.
Internet Protocol Security (IPSec)
Enable secure transfer of data to another location over the Internet, using private and public keys for encryption and digital certificates or shared secret for authentication.
< Back
Next >
Cancel

Figure 8.195. VPN Client or Point-To-Point

4. Select the 'Internet Protocol Security (IPSec)' radio button and click 'Next'. The 'Internet Protocol Security (IPSec)' screen appears.

Figure 8.196. Internet Protocol Security (IPSec)

1. Enter the host or IP address of the destination gateway.

2. Select the method for specifying the remote IP address, which serves as the tunnel's endpoint. Use "Same as Gateway" when connecting your LAN to a remote *gateway*. When connecting your LAN to a remote *network* (a group of computers beyond a gateway), use one of the remaining three options. Also, use the *transport* encapsulation type in a gateway-to-gateway scenario only. Upon selection of an option, the screen will refresh providing you with the appropriate fields for entering the data.

    1. Same as Gateway - the default option that uses the gateway IP entered above. When selecting this option, you must also select the encapsulation type, tunnel or transport, from its combo box.

    2. IP Address - a 'Remote IP Address' field appears. Specify the IP address.

    3. IP Subnet - 'Remote Subnet IP Address' and 'Remote Subnet Mask' fields appear. Specify these parameters.

    4. IP Range - 'From IP Address' and 'To IP Address' fields will appear. Specify the IP range.

3. Enter the IPSec shared secret, which is the encryption key jointly decided upon with the network you are trying to access.

4. Click 'Next'. The 'Connection Summary' screen will appear (see figure Figure 8.197).

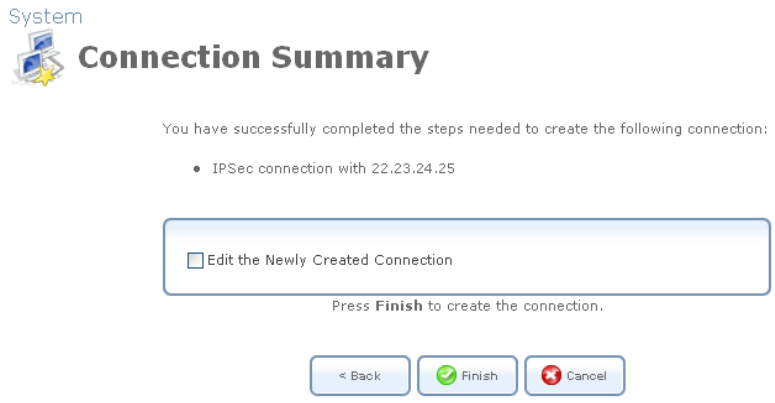


Figure 8.197. Connection Summary

5. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

6. Click 'Finish' to save the settings.

The new IPSec connection will be added to the network connections list, and will be configurable like any connection. Unlike other connections, it is also accessible via the OpenRG's 'Advanced' screen. To learn more about the configuration of an IPSec connection, please refer to section Section 7.10.1 .

8.4.15. Internet Protocol Security Server (IPSec Server)

Creation with the Connection Wizard To create a new IPSec Server, perform the following steps:

1. Click the 'New Connection' link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen appears (see figure Figure 8.11).

2. Select the 'Connect to a Virtual Private Network over the Internet' radio button and click 'Next'. The 'Connect to a Virtual Private Network over the Internet' screen appears (see figure 'Connect to a Virtual Private Network over the Internet').

1. Select the VPN Server radio button and click Next. The 'VPN Server' screen appears:

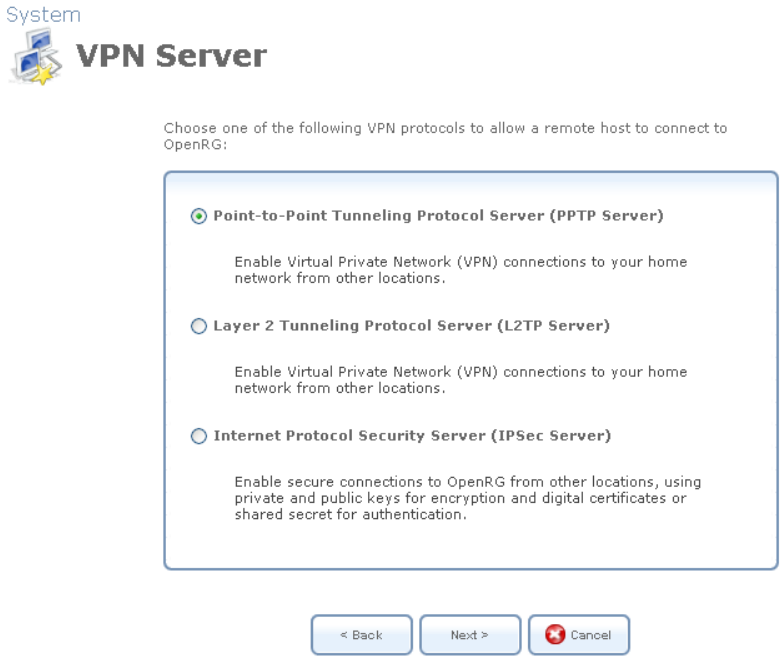

System
VPN Server
Choose one of the following VPN protocols to allow a remote host to connect to OpenRG:
Point-to-Point Tunneling Protocol Server (PPTP Server)
Enable Virtual Private Network (VPN) connections to your home network from other locations.
Layer 2 Tunneling Protocol Server (L2TP Server)
Enable Virtual Private Network (VPN) connections to your home network from other locations.
Internet Protocol Security Server (IPSec Server)
Enable secure connections to OpenRG from other locations, using private and public keys for encryption and digital certificates or shared secret for authentication.
< Back
Next >
Cancel

Figure 8.198. VPN Server

2. Select the 'Internet Protocol Security Server (IPSec Server)' radio button and click Next. The 'Internet Protocol Security Server (IPSec Server)' screen appears:

Figure 8.199. Internet Protocol Security Server (IPSec Server)

3. Enter the IPSec shared secret, which is the encryption key jointly decided upon with the network you are trying to access.

4. Click Next. The 'Connection Summary' screen will appear (see figure Figure 8.200).

Figure 8.200. Connection Summary

5. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

6. Click Finish to save the settings.

The new IPSec Server will be added to the network connections list, and will be configurable like any other connection. To learn more about the configuration of an IPSec server, please refer to section Section 7.10.1 .

8.4.16. Dynamic Host Configuration Protocol (DHCP)

The Dynamic Host Configuration Protocol (DHCP) connection wizard utility is one of the three methods used to configure the physical WAN Ethernet connection, described in section Section 8.4.7 . It is a dynamic negotiation method, where the client obtains an IP address automatically from the service provider when connecting to the Internet. To configure a new DHCP connection, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.11).

2. Select the Internet Connection radio button and click Next. The 'Internet Connection' screen will appear (see figure Figure 8.12).

1. Select the Ethernet Connection radio button and click Next. The 'Ethernet Connection' screen appears:

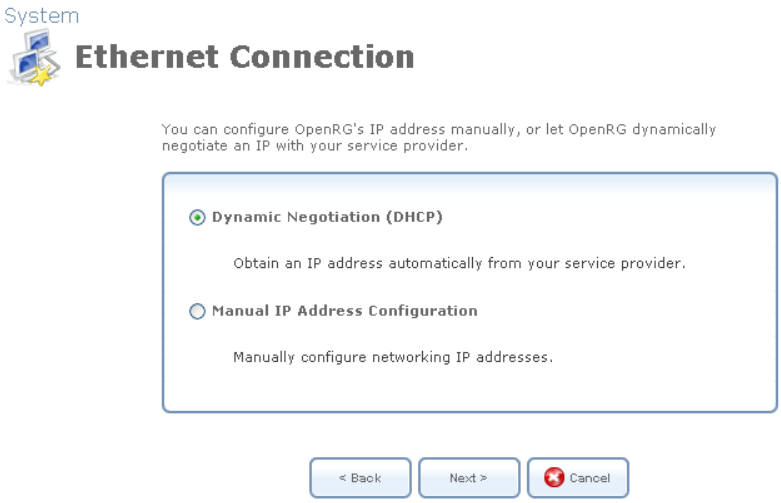

System
Ethernet Connection
You can configure OpenRG's IP address manually, or let OpenRG dynamically negotiate an IP with your service provider.
Dynamic Negotiation (DHCP)
Obtain an IP address automatically from your service provider.
Manual IP Address Configuration
Manually configure networking IP addresses.
< Back
Next >
Cancel

Figure 8.201. Ethernet Connection

2. Select the 'Dynamic Negotiation (DHCP)' radio button and click Next. The 'Connection Summary' screen will appear (see figure Figure 8.202).

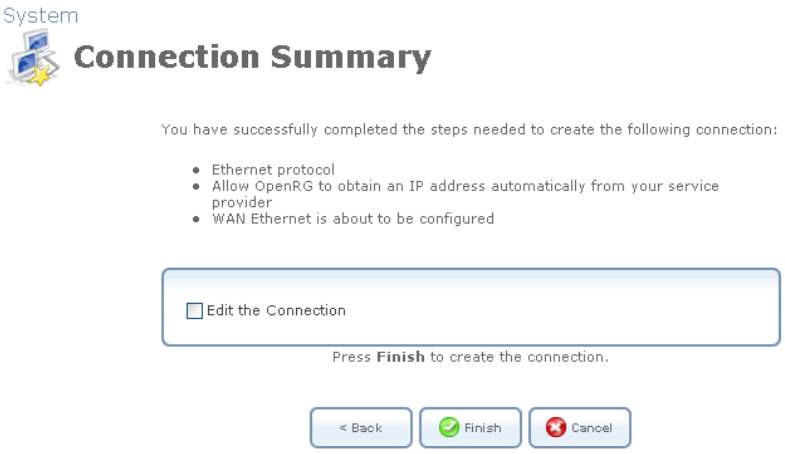

System
Connection Summary
You have successfully completed the steps needed to create the following connection:
Ethernet protocol
Allow OpenRG to obtain an IP address automatically from your service provider
WAN Ethernet is about to be configured
Edit the Connection
Press Finish to create the connection.
< Back
Finish
Cancel

Figure 8.202. Connection Summary

3. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

4. Click Finish to save the settings.

The WAN Ethernet connection will be configured to obtain an IP address using a DHCP. Please refer to section Section 8.4.7 to learn how to view and edit the connection's settings.

Note: If your WAN connection is set to DHCP when there is no DHCP server available, and a PPPoE server is available instead, the device status will show: "Waiting for DHCP Lease - PPPoE server found, consider configuring your WAN connection to PPPoE". If you select this option, please refer to section Section 8.4.8 .

8.4.17. Manual IP Address Configuration

The Manual IP Address Configuration connection wizard utility is one of the three methods used to configure the physical WAN Ethernet connection, described in section Section 8.4.7 . It is used to manually configure the

networking IP addresses when connecting to the Internet. To manually configure the IP addresses, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.11).

2. Select the Internet Connection radio button and click Next. The 'Internet Connection' screen will appear (see figure Figure 8.12).

1. Select the Ethernet Connection radio button and click Next. The 'Ethernet Connection' screen appears:

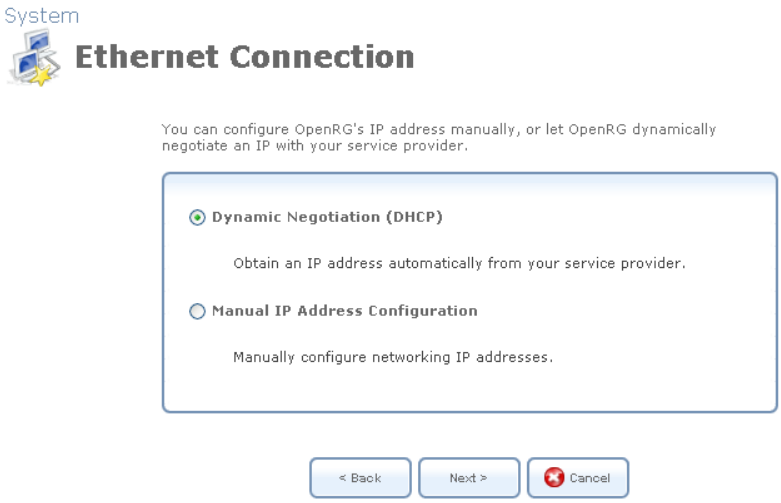

System
Ethernet Connection
You can configure OpenRG's IP address manually, or let OpenRG dynamically negotiate an IP with your service provider.
Dynamic Negotiation (DHCP)
Obtain an IP address automatically from your service provider.
Manual IP Address Configuration
Manually configure networking IP addresses.
< Back
Next >
Cancel

Figure 8.203. Ethernet Connection

2. Select the 'Manual IP Address Configuration' radio button and click Next. The 'Manual IP Address Configuration' screen appears:

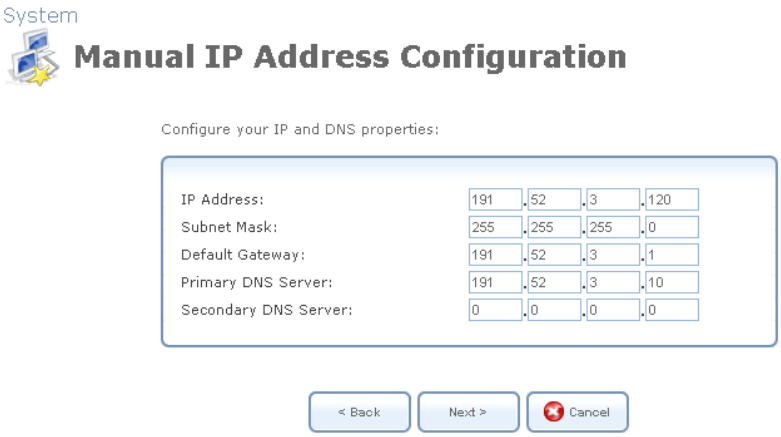

System
Manual IP Address Configuration
Configure your IP and DNS properties:
IP Address: 191 . 52 . 3 . 120
Subnet Mask: 255 . 255 . 255 . 0
Default Gateway: 191 . 52 . 3 . 1
Primary DNS Server: 191 . 52 . 3 . 10
Secondary DNS Server: 0 . 0 . 0 . 0
< Back
Next >
Cancel

Figure 8.204. Manual IP Address Configuration

3. Enter the IP address, subnet mask, default gateway, and DNS server addresses in their respective fields. These values should either be provided to you by your ISP or configured by your system administrator.

4. Click Next. The 'Connection Summary' screen appears:

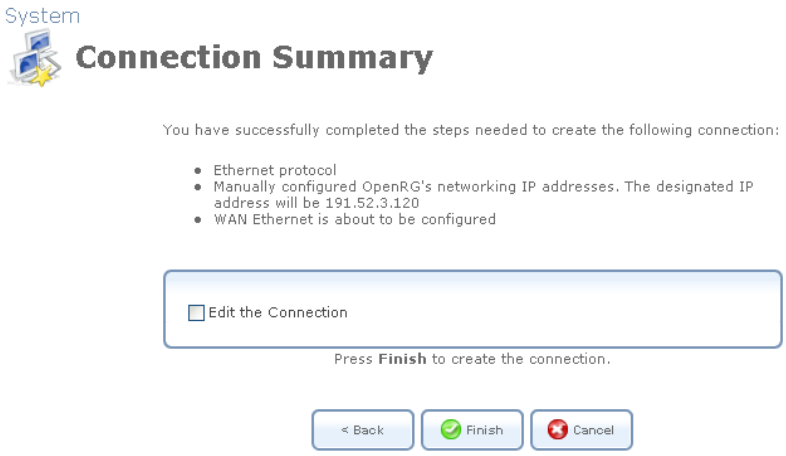

System
Connection Summary
You have successfully completed the steps needed to create the following connection:
Ethernet protocol
Manually configured OpenRG's networking IP addresses. The designated IP address will be 191.52.3.120
WAN Ethernet is about to be configured
Edit the Connection
Press Finish to create the connection.
< Back
Finish
Cancel

Figure 8.205. Connection Summary

5. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

6. Click Finish to save the settings.

The WAN Ethernet connection will be configured with the new settings. Please refer to section Section 8.4.7 to learn how to view and edit the connection's settings.

8.4.18. Determine Protocol Type Automatically

The Determine Protocol Type Automatically (PVC Scan) connection wizard utility, available with the DSL gateway, allows you to automatically scan for a VPI/VCI pair, necessary when connecting with DSL. In case such a pair is not found, your service provider should supply you with one. To automatically scan for a VPI/VCI pair, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.18).

2. Select the Internet DSL Connection radio button and click Next. The 'Internet DSL Connection' screen will appear (see figure Figure 8.19).

1. Select the 'Determine Protocol Type Automatically (PVC Scan)' radio button and click Next. The scan will begin, refreshing the screen every few seconds to display the progress (see figure Figure 8.206).

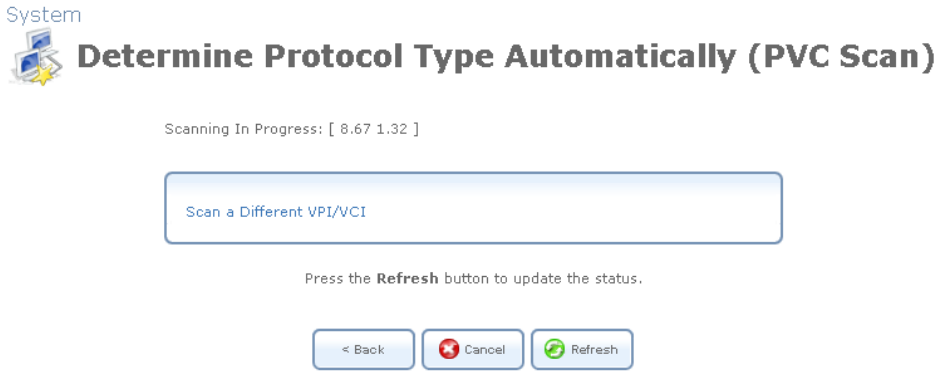


Figure 8.206. Determine Protocol Type Automatically (PVC Scan)

When the scan completes, a message indicating success or failure will be posted.

2. If the scan had failed, the screen will present the following options (see figure Figure 8.207):

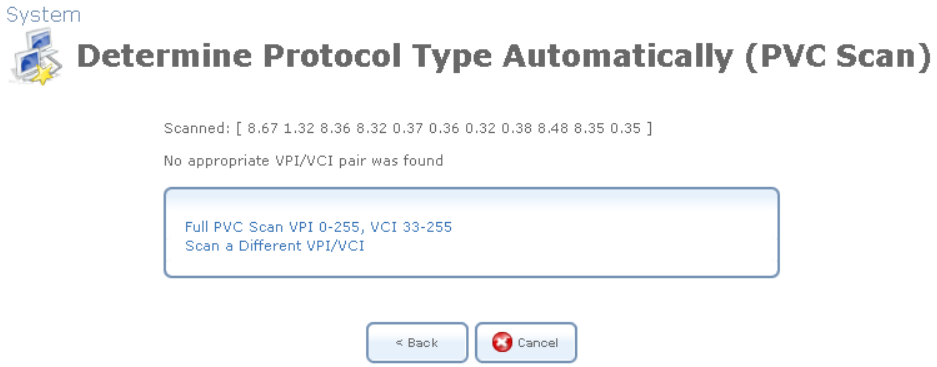

System
Determine Protocol Type Automatically (PVC Scan)
Scanned: [8.67 1.32 8.36 8.32 0.37 0.36 0.32 0.38 8.48 8.35 0.35]
No appropriate VPI/VCI pair was found
Full PVC Scan VPI 0-255, VCI 33-255
Scan a Different VPI/VCI
< Back
Cancel

Figure 8.207. PVC Scan - No Pair was Found

- "Full PVC Scan VPI 0-255, VCI 33-255" - click this link to initiate a longer, more thorough scan, between VPI 0-255 and VCI 33-255.
- "Scan a Different VPI/VCI" - click this link to scan for specific VPI/VCI pair. The 'Scan User Defined VPI/VCI' screen will appear (see figure Figure 8.208). Enter the VPI/VCI pair you wish to scan and click 'OK'.

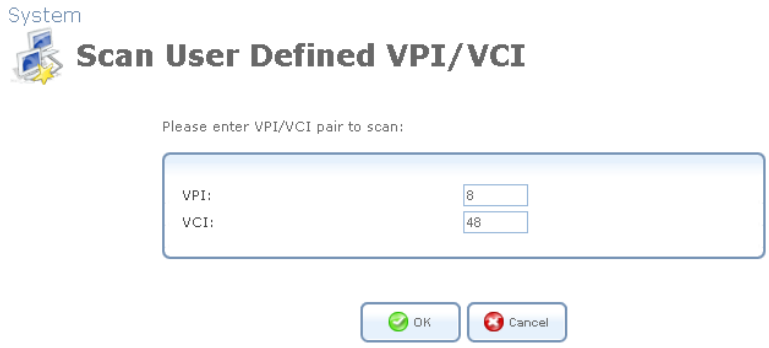


Figure 8.208. Scan User Defined VPI/VCI

8.4.19. Point-to-Point Protocol over ATM (PPPoA)

Point-to-Point Protocol over ATM (PPPoA) is a standard for incorporating the popular PPP protocol into a DSL connection that uses ATM as its networking protocol. From the PC, IP packets travel over an Ethernet connection to the gateway, which encapsulates the PPP protocol to the IP packets and transports them to the service provider's DSLAM over ATM.

8.4.19.1. Creation with the Connection Wizard

To create a new PPPoA connection, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.18).
2. Select the Internet DSL Connection radio button and click Next. The 'Internet DSL Connection' screen will appear (see figure Figure 8.19).
1. Select the Point-to-Point Protocol over ATM (PPPoA) radio button and click Next. The 'DSL PVC Parameters Configuration' screen will appear (see figure Figure 8.209).

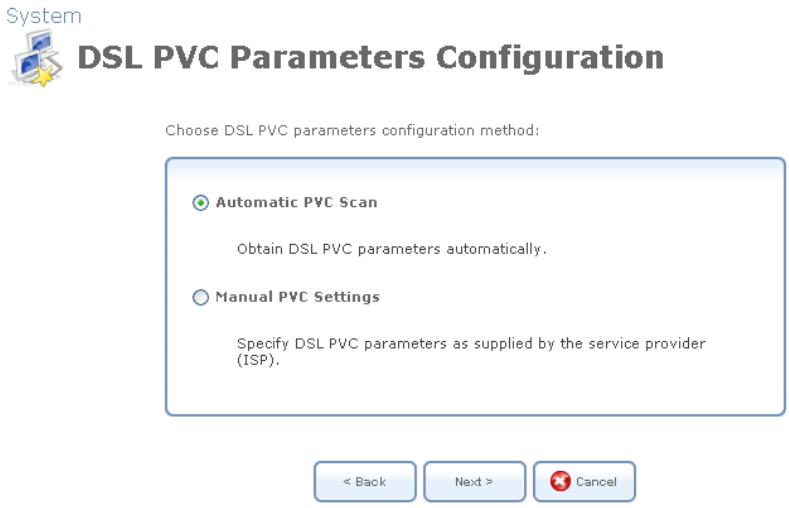

System
DSL PVC Parameters Configuration
Choose DSL PVC parameters configuration method:
Automatic PVC Scan
Obtain DSL PVC parameters automatically.
Manual PVC Settings
Specify DSL PVC parameters as supplied by the service provider (ISP).
< Back
Next >
Cancel

Figure 8.209. DSL PVC Parameters Configuration

2. If you wish to obtain the DSL PVC parameters automatically, check the Automatic PVC Scan radio button and click Next. Please refer to section Section 8.4.18 for more information. Otherwise, check the Manual PVC Settings radio button and click Next. The 'Point-to-Point Protocol over ATM (PPPoA)' screen will appear (see figure Figure 8.210).

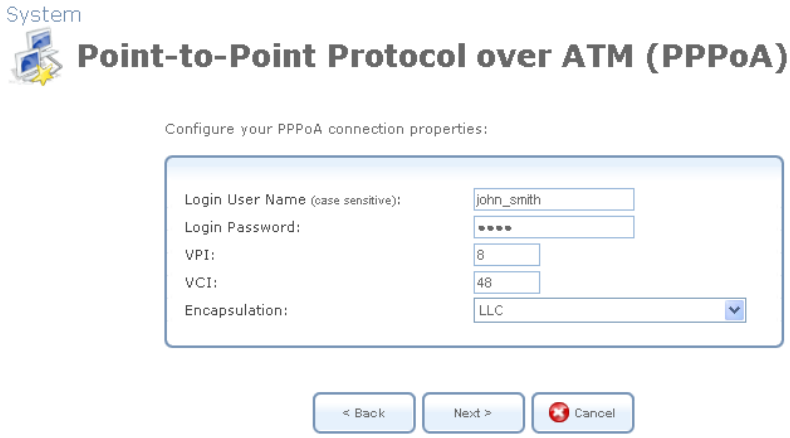


Figure 8.210. Point-to-Point Protocol over ATM

3. Enter your username and password, which should be provided to you by your Internet Service Provider (ISP). If you chose a manual PVC scan in the previous step, you will be required to enter the following parameters as well:

   - The VPI and VCI pair of identifiers.
   - The encapsulation method: LLC, VCMux, or VCMux HDLC.

4. Click Next. The 'Connection Summary' screen will appear (see figure Figure 8.211).

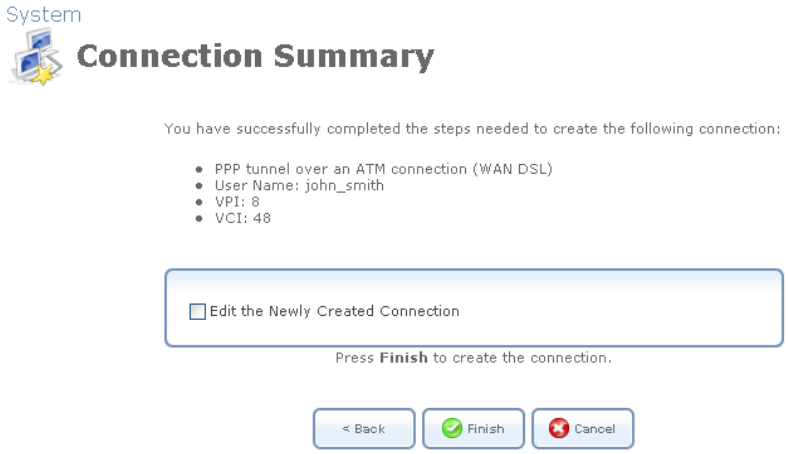


Figure 8.211. Connection Summary

5. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

6. Click Finish to save the settings.

The new PPPoA connection will be added to the network connections list, and will be configurable like any other connection.

8.4.19.2. General

To view and edit the PPPoA connection settings, click the 'WAN PPPoA' link in the 'Network Connections' screen (see figure Figure 8.10). The 'WAN PPPoA Properties' screen will appear (see figure Figure 8.212), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

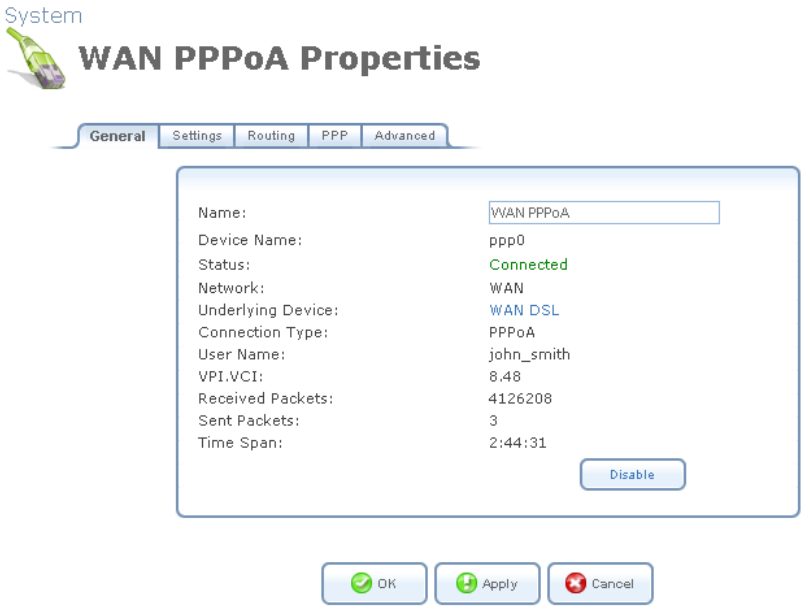


Figure 8.212. WAN PPPoA Properties

8.4.19.3. Settings

General This section displays the connection's general parameters.

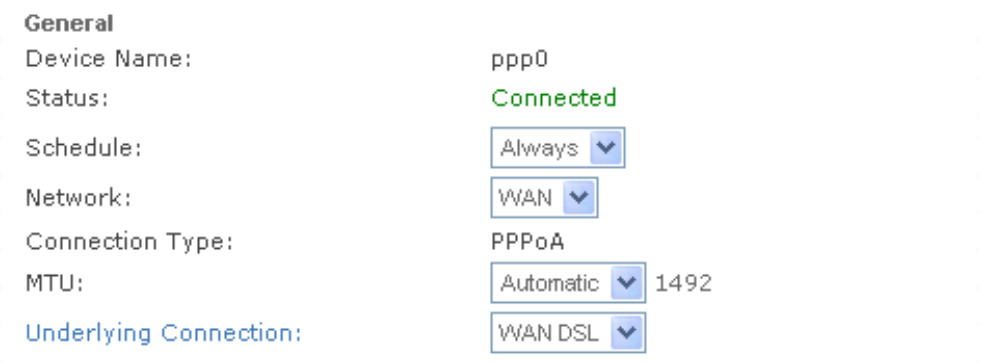


Figure 8.213. General PPPoA Settings

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

Underlying Connection Specify the underlying connection above which the protocol will be initiated.

ATM

Asynchronous Transfer Mode (ATM) is a network technology based on transferring data in cells or packets of a fixed size. The cell used with ATM is relatively small compared to units used with other technologies. The small, constant cell size allows the transmission of video, audio, and computer data, assuring that no single type of data consumes the connection. ATM addressing consists of two identifiers that identify the virtual path (VPI) and the virtual connection (VCI). A virtual path consists of multiple virtual channels to the same endpoint.
The 'Encapsulation' for connection should be set to either 'LLC' or 'VCMux'. You should configure these parameters according to the information provided by your ISP.

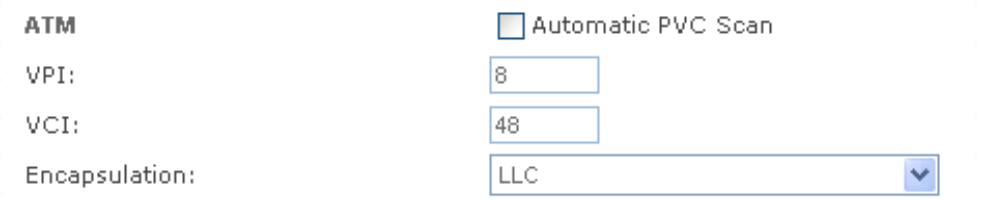


Figure 8.214. ATM Settings

Internet Protocol Select one of the following Internet protocol options from the 'Internet Protocol' combo-box:

- Obtain an IP Address Automatically
- Use the Following IP Address

Please note that the screen will refresh to display relevant configuration settings according to your choice.

Obtain an IP Address Automatically Your connection is configured by default to obtain an IP automatically. You should change this configuration in case your service provider requires it. The server that assigns the gateway with an IP address, also assigns a subnet mask. You can override the dynamically assigned subnet mask by selecting the 'Override Subnet Mask' and specifying your own mask instead.

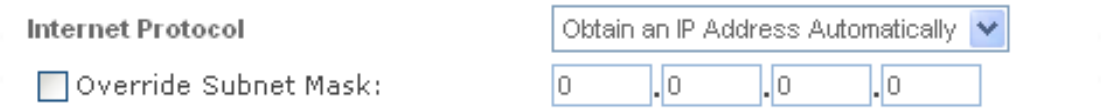


Figure 8.215. Internet Protocol -- Automatic IP

Use the Following IP Address Your connection can be configured using a permanent (static) IP address. Your service provider should provide you with such an IP address and subnet mask.

Figure 8.216. Internet Protocol -- Static IP

DNS Server Domain Name System (DNS) is the method by which Web site domain names are translated into IP addresses. You can configure the connection to automatically obtain a DNS server address, or specify such an address manually, according to the information provided by your ISP. To configure the connection to automatically obtain a DNS server address, select 'Obtain DNS Server Address Automatically' from the 'DNS Server' drop down menu.

Figure 8.217. DNS Server -- Automatic IP

To manually configure DNS server addresses, select 'Use the Following DNS Server Addresses' from the 'DNS Server' drop down menu (see figure 'DNS Server -- Static IP'). Specify up to two different DNS server address, one primary, another secondary.

Figure 8.218. DNS Server -- Static IP

To learn more about this feature, turn to chapter Section 7.13.1 .

8.4.19.4. Routing

You can choose to setup your gateway to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Routing Mode Select one of the following routing modes:

Route Use route mode if you want your gateway to function as a router between two networks.

NAPT Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.

Device Metric The device metric is a value used by the gateway to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.

Default Route Select this check box to define this device as a the default route.

Routing Information Protocol (RIP) Select this check box to enable the Routing Information Protocol (RIP). RIP determines a route based on the smallest hop count between source and destination. When RIP is enabled, select the following:

- Listen to RIP messages - select 'None', 'RIPv1', 'RIPv2' or 'RIPv1/2'.
- Send RIP messages - select 'None', 'RIPv1', 'RIPv2-broadcast' or 'RIPv2-multicast'.

Multicast - IGMP Proxy Internal IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups. Select the 'Multicast IGMP Proxy Internal' check-box to enable this feature.

IGMP Query Version OpenRG supports all three versions of IGMP. Select the version you would like to use.

Routing Table Allows you to add or modify routes when this device is active. Use the 'New Route' button to add a route or edit existing routes.

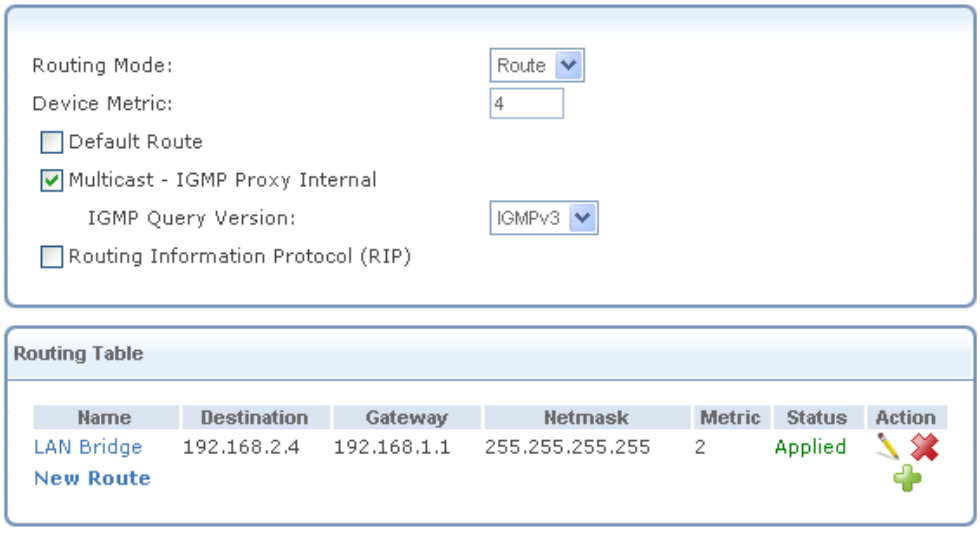


Figure 8.219. Advanced Routing Properties

To learn more about this feature, please refer to chapter Section 8.6.1 .

8.4.19.5. PPP

PPP
Point-to-Point Protocol (PPP) is the most popular method for transporting packets between the user and the Internet service provider. PPP supports authentication protocols such as PAP and CHAP, as well as other compression and encryption protocols.

PPP-on-Demand Use PPP on demand to initiate the point-to-point protocol session only when packets are actually sent over the Internet.

Time Between Reconnect Attempts Specify the duration between PPP reconnected attempts, as provided by your ISP.

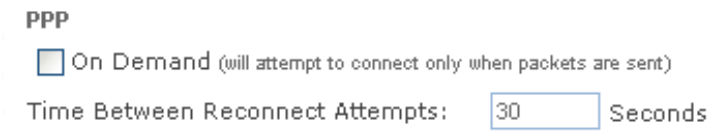


Figure 8.220. PPP Configuration

PPP Authentication Point-to-Point Protocol (PPP) currently supports four authentication protocols: Password Authentication Protocol (PAP), Challenge Handshake Authentication Protocol (CHAP), and Microsoft CHAP version 1 and 2. This section allows you to select the authentication protocols your gateway may use when negotiating with a PPTP server. Select all the protocols if no information is available about the server's authentication protocols. Please note that encryption is performed only if 'Microsoft CHAP', 'Microsoft CHAP version 2', or both are selected.

Figure 8.221. PPP Authentication

Login User Name As agreed with ISP.

Login Password As agreed with ISP.

Support Unencrypted Password (PAP) Password Authentication Protocol (PAP) is a simple, plain-text authentication scheme. The user name and password are requested by your networking peer in plain-text. PAP, however, is not a secure authentication protocol. Man-in-the-middle attacks can easily determine the remote access client's password. PAP offers no protection against replay attacks, remote client impersonation, or remote server impersonation.

Support Challenge Handshake Authentication (CHAP) The Challenge Handshake Authentication Protocol (CHAP) is a challenge-response authentication protocol that uses MD5 to hash the response to a challenge. CHAP protects against replay attacks by using an arbitrary challenge string per authentication attempt.

Support Microsoft CHAP Select this check box if you are communicating with a peer that uses Microsoft CHAP authentication protocol.

Support Microsoft CHAP Version 2 Select this check box if you are communicating with a peer that uses Microsoft CHAP Version 2 authentication protocol.

PPP Encryption PPP supports encryption facilities to secure the data across the network connection. A wide variety of encryption methods may be negotiated, although typically only one method is used in each direction of the link. This section allows you to select the encryption methods your gateway may use when negotiating with a PPTP server. Select all the methods if no information is available about the server's encryption methods. Please note that PPP encryption can only be used with MS-CHAP or MS-CHAP-V2 authentication protocols.

PPP Encryption
Require Encryption (Disconnect If Server Declines)
Support Encryption (40 Bit Keys)
Support Maximum Strength Encryption (128 Bit Keys)

Figure 8.222. PPP Encryption

Require Encryption Select this check box to ensure that the PPP connection is encrypted.

Support Encryption (40 Bit Keys) Select this check box if your peer supports 40 bit encryption keys.

Support Maximum Strength Encryption (128 Bit Keys) Select this check box if your peer supports 128 bit encryption keys.

PPP Compression The PPP Compression Control Protocol (CCP) is responsible for configuring, enabling, and disabling data compression algorithms on both ends of the point-to-point link. It is also used to signal a failure of the compression/ decompression mechanism in a reliable manner.

Figure 8.223. PPP Compression

For each compression algorithm, select one of the following from the drop down menu:

Reject Reject PPP connections with peers that use the compression algorithm.

Allow Allow PPP connections with peers that use the compression algorithm.

Require Ensure a connection with a peer is using the compression algorithm.

8.4.19.6. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

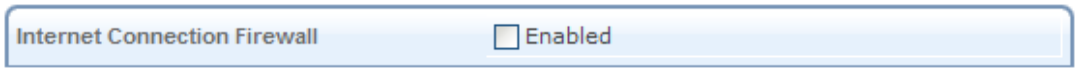


Figure 8.224. Internet Connection Firewall

8.4.20. Ethernet over ATM (ETHoA)

The Ethernet over ATM (ETHoA) connection allows transport of Ethernet frames on DSL connections.

8.4.20.1. Creation with the Connection Wizard

When creating an ETHoA connection via the 'Internet DSL Connection' section, it is bridged to the LAN. You must configure a dialup connection on the LAN computer with your ISP's user name and password. To create a new ETHoA connection, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.18).

2. Select the Internet DSL Connection radio button and click Next. The 'Internet DSL Connection' screen will appear (see figure Figure 8.19).

1. Select the Ethernet Connection over ATM (ETHoA) radio button and click Next. The 'Ethernet Connection over ATM (ETHoA)' screen appears:

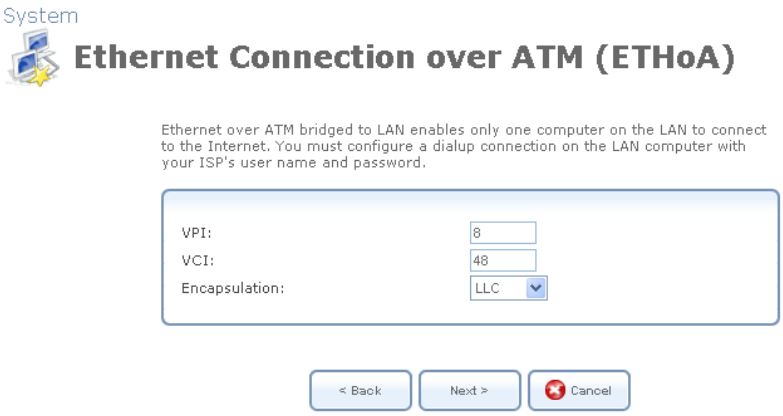

System
Ethernet Connection over ATM (ETHoA)
Ethernet over ATM bridged to LAN enables only one computer on the LAN to connect to the Internet. You must configure a dialup connection on the LAN computer with your ISP's user name and password.
VPI:
8
VCI:
48
Encapsulation:
LLC
< Back
Next >
Cancel

Figure 8.225. Ethernet Connection over ATM

2. Enter the following information, which should be provided to you by your Internet Service Provider (ISP):

   - The VPI and VCI pair of identifiers.

   - The encapsulation method: LLC or VCMux.

3. Click Next. The 'Connection Summary' screen appears:

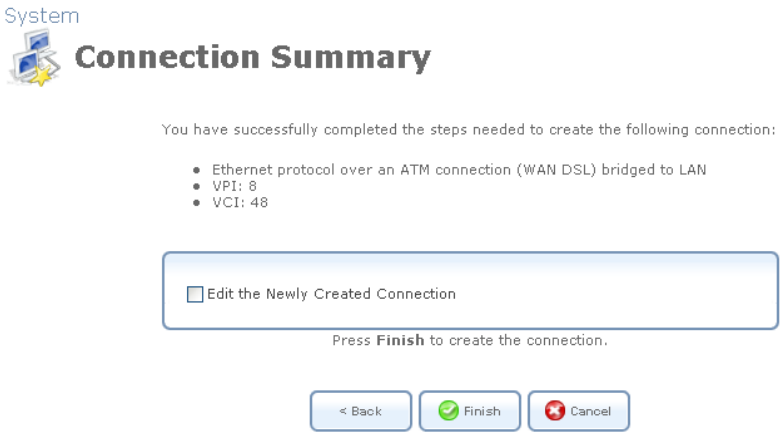

System
Connection Summary
You have successfully completed the steps needed to create the following connection:
Ethernet protocol over an ATM connection (WAN DSL) bridged to LAN
VPI: 8
VCI: 48
Edit the Newly Created Connection
Press Finish to create the connection.
< Back
Finish
Cancel

Figure 8.226. Connection Summary

4. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

5. Click Finish to save the settings.

The new ETHoA connection will be added to the network connections list, and will be configurable like any other connection.

8.4.20.2. General

To view and edit the ETHoA connection settings, click the 'WAN ETHoA' link in the 'Network Connections' screen (see figure Figure 8.10). The 'WAN ETHoA Properties' screen will appear (see figure Figure 8.227), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

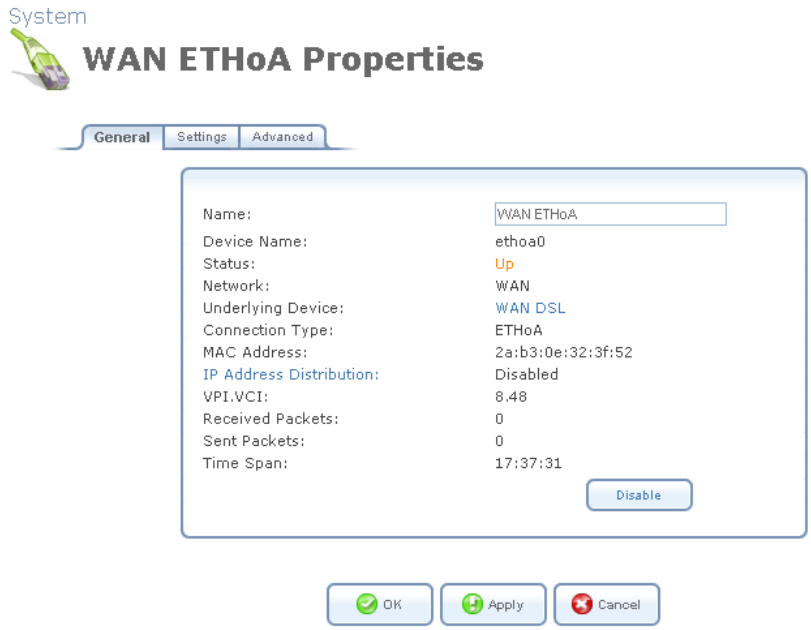


Figure 8.227. WAN ETHoA Properties

8.4.20.3. Settings

General This section displays the connection's general parameters.

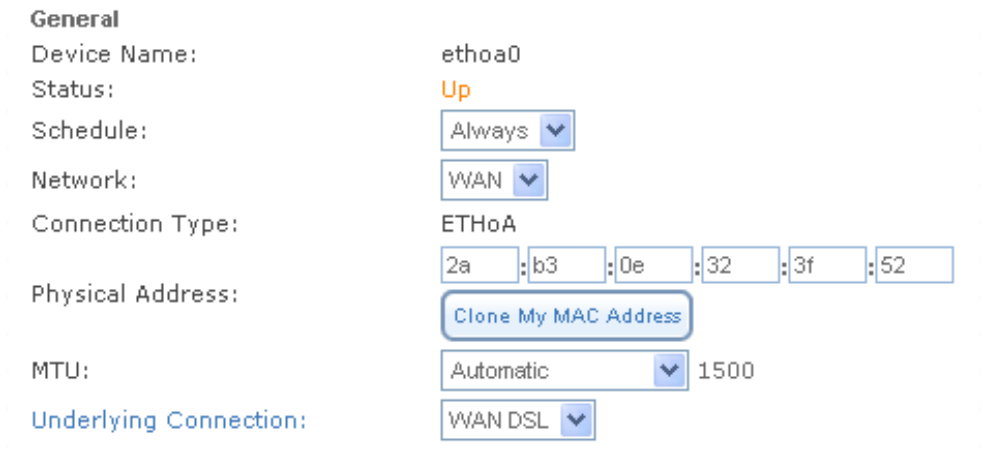


Figure 8.228. General ETHoA Settings

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

Physical Address The physical address of the network card used for your network. Some cards allow you to change this address.

Clone My MAC Address Press this button to copy your PC's current MAC address to the board.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

Underlying Connection Specify the underlying connection above which the protocol will be initiated.

ATM

Asynchronous Transfer Mode (ATM) is a network technology based on transferring data in cells or packets of a fixed size. The cell used with ATM is relatively small compared to units used with other technologies. The small, constant cell size allows the transmission of video, audio, and computer data, assuring that no single type of data consumes the connection. ATM addressing consists of two identifiers that identify the virtual path (VPI) and the virtual connection (VCI). A virtual path consists of multiple virtual channels to the same endpoint.
The 'Encapsulation' for connection should be set to either 'LLC' or 'VCMux'. You should configure these parameters according to the information provided by your ISP.

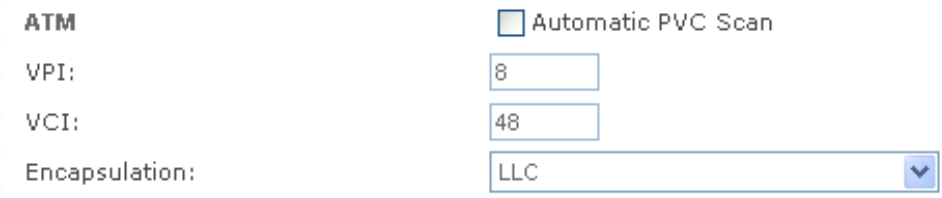


Figure 8.229. ATM Settings

Internet Protocol Select one of the following Internet protocol options from the 'Internet Protocol' combo-box:

- No IP Address
- Obtain an IP Address Automatically
- Use the Following IP Address

Please note that the screen will refresh to display relevant configuration settings according to your choice.

No IP Address Select 'No IP Address' if you require that your gateway have no IP address. This can be useful if you are working in an environment where you are not connected to other networks, such as the Internet.

Figure 8.230. Internet Protocol -- No IP Address

Obtain an IP Address Automatically Your connection is configured by default to act as a DHCP client. You should keep this configuration in case your service provider supports DHCP, or if you are connecting using a dynamic IP address. The server that assigns the gateway with an IP address, also assigns a subnet mask. You can override the dynamically assigned subnet mask by selecting the 'Override Subnet Mask' and specifying your own mask instead. You can press the 'Release' button to release the current leased IP address. Once the address has been released, the button text changes to 'Renew'. Use the 'Renew' button to renew the leased IP address.

Figure 8.231. Internet Protocol Settings -- Automatic IP

Use the Following IP Address Your connection can be configured using a permanent (static) IP address. Your service provider should provide you with such an IP address and subnet mask.

Figure 8.232. Internet Protocol -- Static IP

8.4.20.4. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

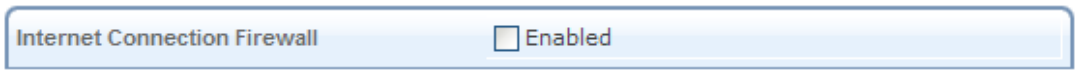


Figure 8.233. Internet Connection Firewall

- **Additional IP Addresses** You can add alias names (additional IP addresses) to the gateway by clicking the 'New IP Address' link. This enables you to access the gateway using these aliases in addition to the 192.168.1.1 and the http://openrg.home.

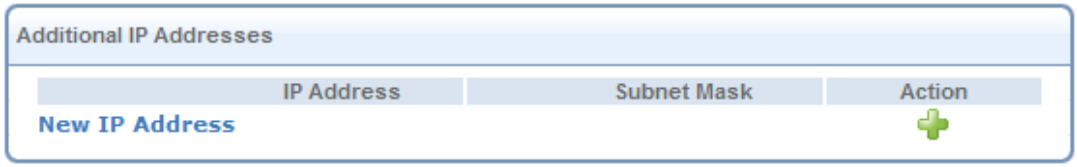


Figure 8.234. Additional IP Addresses

8.4.21. Classical IP over ATM (CLIP)

Classical IP (CLIP) is a standard for transmitting IP traffic in an ATM network. IP protocols contain IP addresses that have to be converted into ATM addresses, and Classical IP performs this conversion, as long as the destination is within the same subnet. Classical IP does not support routing between networks. The Classical IP-enabled driver in the end station sends out an ARP request to a Classical IP-enabled ARP server, which returns the ATM address.

8.4.21.1. Creation with the Connection Wizard

To create a new CLIP connection, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.18).

2. Select the Internet DSL Connection radio button and click Next. The 'Internet DSL Connection' screen will appear (see figure Figure 8.19).

1. Select the Classical IP over ATM (CLIP) radio button and click Next. The 'Classical IP over ATM (CLIP)' screen appears:

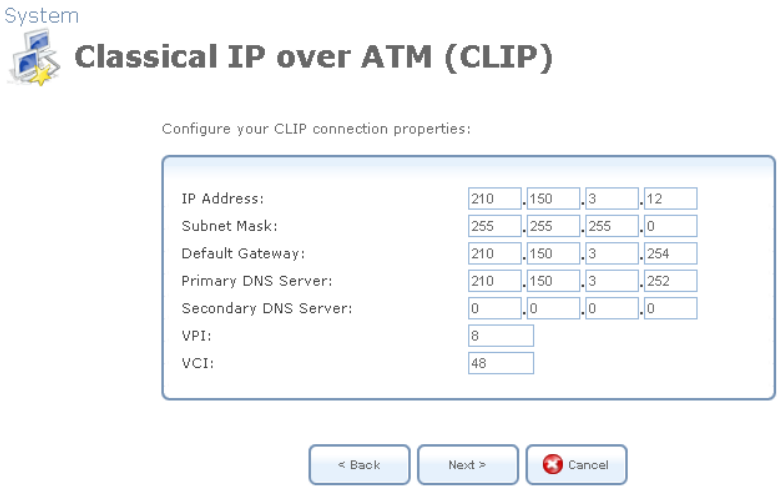

System
Classical IP over ATM (CLIP)
Configure your CLIP connection properties:
IP Address: 210 . 150 . 3 . 12
Subnet Mask: 255 . 255 . 255 . 0
Default Gateway: 210 . 150 . 3 . 254
Primary DNS Server: 210 . 150 . 3 . 252
Secondary DNS Server: 0 . 0 . 0 . 0
VPI: 8
VCI: 48
< Back
Next >
Cancel

Figure 8.235. Classical IP over ATM

2. Enter the following information, which should be provided to you by your Internet Service Provider (ISP):
   - IP Address
   - Subnet Mask
   - Default Gateway
   - Primary DNS Server
   - Secondary DNS Server
   - The VPI and VCI pair of identifiers
3. Click Next. The 'Connection Summary' screen appears:

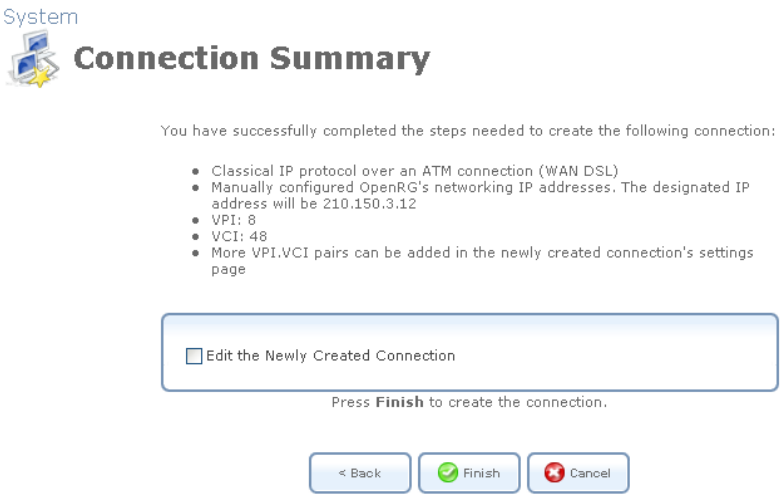

System
Connection Summary
You have successfully completed the steps needed to create the following connection:
Classical IP protocol over an ATM connection (WAN DSL)
Manually configured OpenRG's networking IP addresses. The designated IP address will be 210.150.3.12
VPI: 8
VCI: 48
More VPI.VCI pairs can be added in the newly created connection's settings page
Edit the Newly Created Connection
Press Finish to create the connection.
< Back
Finish
Cancel

Figure 8.236. Connection Summary

4. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.
5. Click Finish to save the settings.

The new CLIP connection will be added to the network connections list, and will be configurable like any other connection.

8.4.21.2. General

To view and edit the CLIP connection settings, click the 'WAN Classical IP over ATM' link in the 'Network Connections' screen (see figure Figure 8.10). The 'WAN Classical IP over ATM Properties' screen will appear (see figure Figure 8.237), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

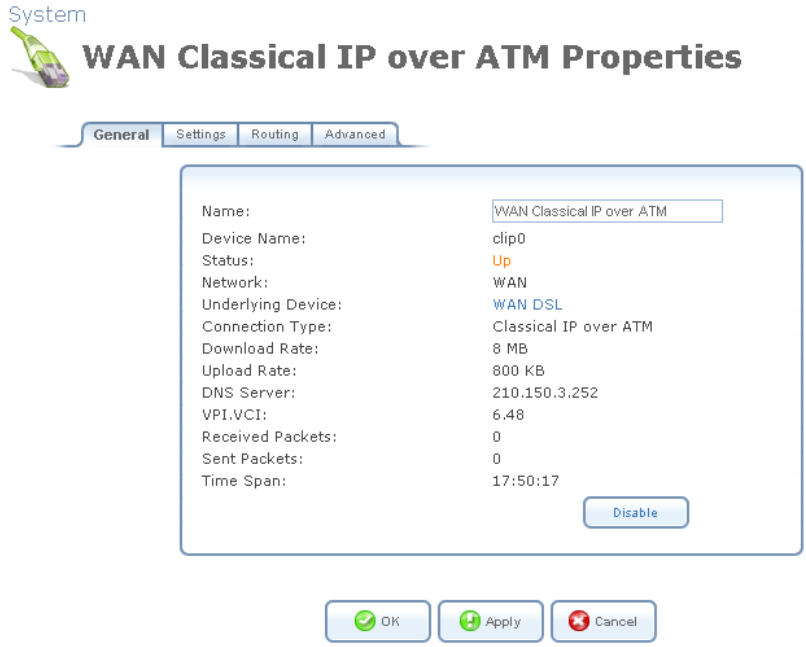


Figure 8.237. WAN Classical IP over ATM Properties

8.4.21.3. Settings

General This section displays the connection's general parameters.

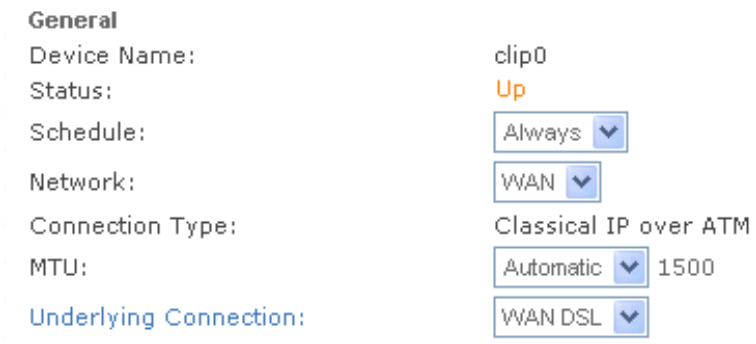


Figure 8.238. General CLIP Settings

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

Underlying Connection Specify the underlying connection above which the protocol will be initiated.

VPI.VCI ATM addressing consists of two identifiers that identify the virtual path (VPI) and the virtual connection (VCI). A virtual path consists of multiple virtual channels to the same endpoint. The 'Encapsulation' for connection should be set to either 'LLC' or 'VCMux'. You should configure these parameters according to the information provided by your ISP.

Figure 8.239. VPI.VCI

To change VPI/VCI connection parameters, perform the following:

1. Click the 'New VPI.VCI' link, the 'VPI.VCI Settings' screen will appear (see figure Figure 8.240).
2. Specify the VPI and VCI pair of identifiers according to the information provided by your ISP.

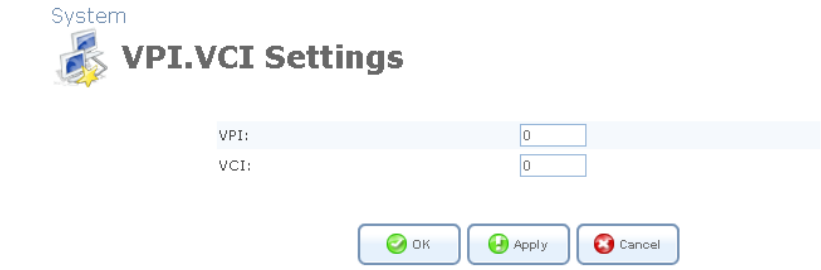


Figure 8.240. VPI.VCI Settings

3. Click 'OK' to save the settings.

Internet Protocol This connection always uses a specified IP address. Your service provider should provide you with this IP address, subnet mask, the default gateway and DNS server.

Figure 8.241. Internet Protocol Settings - Static IP

DNS Server Domain Name System (DNS) is the method by which Web site domain names are translated into IP addresses. You can configure the connection to automatically obtain a DNS server address, or specify such an address manually, according to the information provided by your ISP. To configure the connection to automatically obtain a DNS server address, select 'Obtain DNS Server Address Automatically' from the 'DNS Server' drop down menu.

Figure 8.242. DNS Server -- Automatic IP

To manually configure DNS server addresses, select 'Use the Following DNS Server Addresses' from the 'DNS Server' drop down menu (see figure 'DNS Server -- Static IP'). Specify up to two different DNS server address, one primary, another secondary.

Figure 8.243. DNS Server -- Static IP

To learn more about this feature, turn to chapter Section 7.13.1 .

8.4.21.4. Routing

You can choose to setup your gateway to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Routing Mode Select one of the following routing modes:

Route Use route mode if you want your gateway to function as a router between two networks.

NAPT Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.

Device Metric The device metric is a value used by the gateway to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.

Default Route Select this check box to define this device as a the default route.

Routing Information Protocol (RIP) Select this check box to enable the Routing Information Protocol (RIP). RIP determines a route based on the smallest hop count between source and destination. When RIP is enabled, select the following:

- Listen to RIP messages - select 'None', 'RIPv1', 'RIPv2' or 'RIPv1/2'.
- Send RIP messages - select 'None', 'RIPv1', 'RIPv2-broadcast' or 'RIPv2-multicast'.

Multicast - IGMP Proxy Internal IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups. Select the 'Multicast IGMP Proxy Internal' check-box to enable this feature.

IGMP Query Version OpenRG supports all three versions of IGMP. Select the version you would like to use.

Routing Table Allows you to add or modify routes when this device is active. Use the 'New Route' button to add a route or edit existing routes.

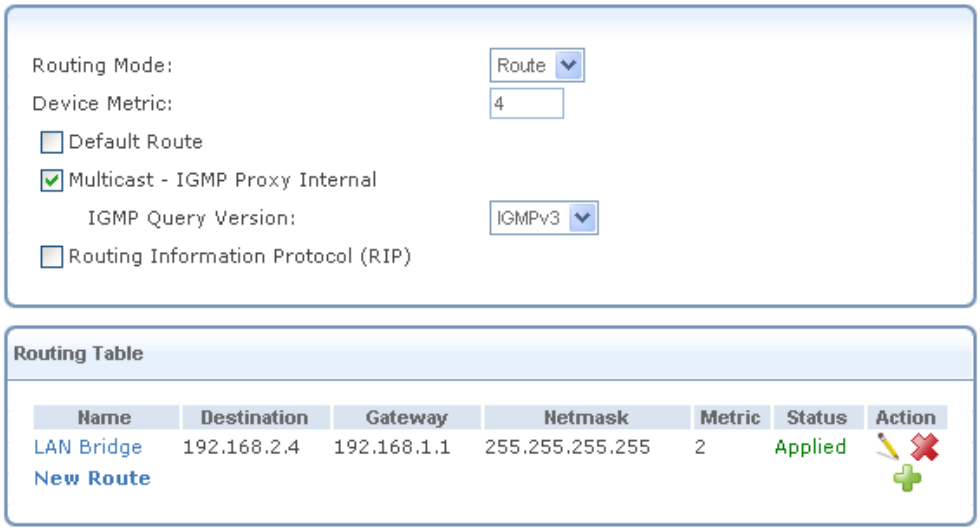


Figure 8.244. Advanced Routing Properties

To learn more about this feature, please refer to chapter Section 8.6.1 .

8.4.21.5. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

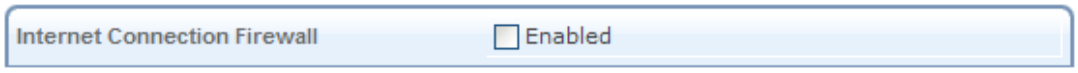


Figure 8.245. Internet Connection Firewall

8.4.22. WAN-LAN Bridge

A WAN-LAN bridge is a bridge over WAN and LAN devices. This way computers on the OpenRG LAN side can get IP addresses that are known on the WAN side.

8.4.22.1. Creation with the Connection Wizard

To configure an existing bridge or create a new one, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.11).

2. Select the Advanced Connection radio button and click Next. The 'Advanced Connection' screen will appear (see figure Figure 8.16).

1. Select the Network Bridging radio button and click Next. The 'Bridge Options' screen will appear (see figure 'Bridge Options').

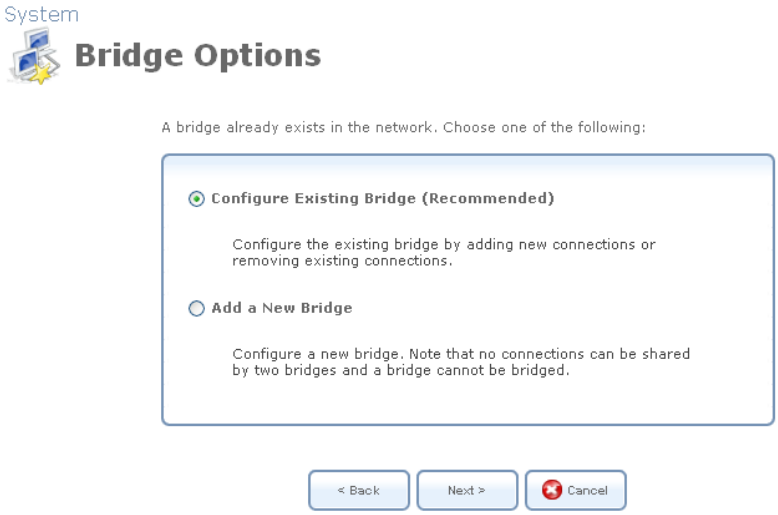

System
Bridge Options
A bridge already exists in the network. Choose one of the following:
Configure Existing Bridge (Recommended)
Configure the existing bridge by adding new connections or removing existing connections.
Add a New Bridge
Configure a new bridge. Note that no connections can be shared by two bridges and a bridge cannot be bridged.
< Back
Next >
Cancel

Figure 8.246. Bridge Options

2. Select whether to configure an existing bridge (this option will only appear if a bridge exists) or to add a new one:

    1. Configure Existing Bridge Select this option and click Next. The 'Network Bridging' screen will appear (see figure 'Network Bridging -- Configure Existing Bridge') allowing you to add new connections or remove existing ones, by checking or unchecking their respective check boxes. For example, check the WAN check box to create a LAN-WAN bridge.

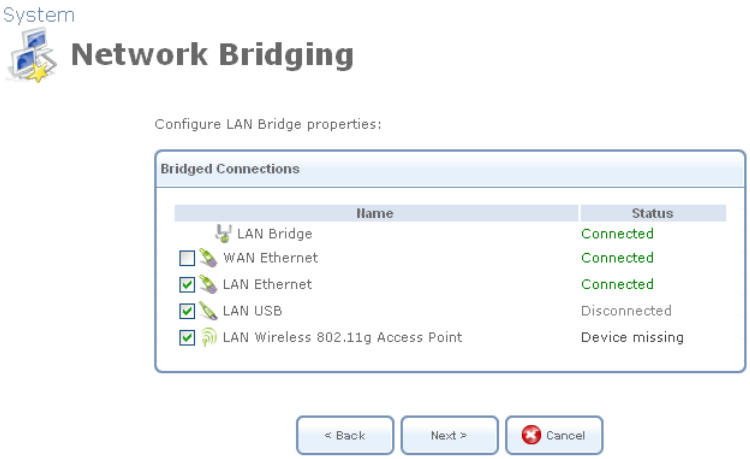


Figure 8.247. Network Bridging -- Configure Existing Bridge

    2. Add a New Bridge Select this option and click Next. A different 'Network Bridging' screen will appear (see figure 'Network Bridging -- Add a New Bridge') allowing you to add a bridge over the unbridged connections, by checking their respective check boxes.

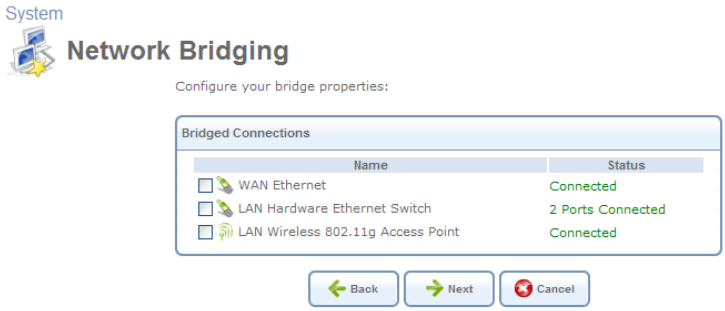


Figure 8.248. Network Bridging -- Add a New Bridge

Important notes:

- The same connections cannot be shared by two bridges.
- A bridge cannot be bridged.
- Bridged connections will lose their IP settings.

3. Click Next. The 'Connection Summary' screen will appear (see figure 'Connection Summary - Configure Existing Bridge'), corresponding to your changes.

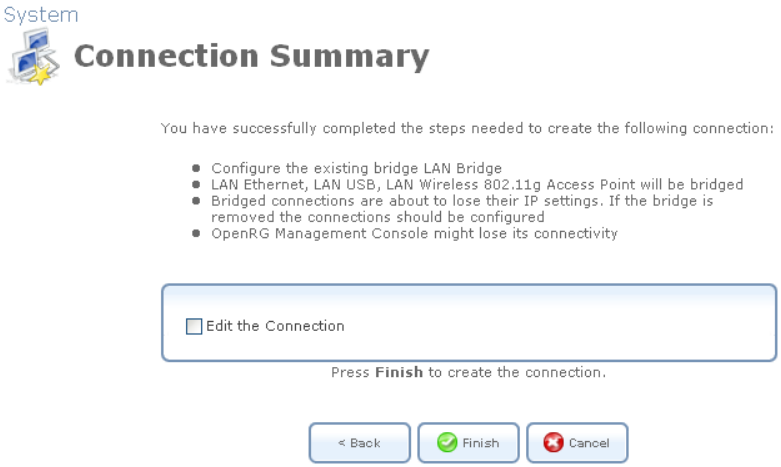

System
Connection Summary
You have successfully completed the steps needed to create the following connection:
Configure the existing bridge LAN Bridge
LAN Ethernet, LAN USB, LAN Wireless 802.11g Access Point will be bridged
Bridged connections are about to lose their IP settings. If the bridge is removed the connections should be configured
OpenRG Management Console might lose its connectivity
Edit the Connection
Press Finish to create the connection.
< Back
Finish
Cancel

Figure 8.249. Connection Summary - Configure Existing Bridge

4. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

5. Click Finish to save the settings.

The new bridge will be added to the network connections list, and will be configurable like any other bridge.

8.4.22.2. Setting up a Hybrid Bridging Mode

OpenRG enables you to bridge certain bandwidth-consuming and traffic-sensitive LAN hosts, such as IPTV Set Top Boxes, directly to the WAN. Such a network connection scheme does not interfere with OpenRG's routing mode, in which all traffic usually passes through the NAT, and is checked by the firewall. These two modes can work simultaneously, if you have two bridges under OpenRG's LAN network device:

LAN bridge Receives its IP address from OpenRG's DHCP server. The traffic passing through the LAN on its way to the WAN is inspected by OpenRG's firewall, and assigned a public address by the NAT.

WAN-LAN bridge Receives its IP address from the WAN DHCP server, thereby enabling direct communication with the WAN.
OpenRG based on Linux 2.6 supports direct communication between devices placed under the two bridges. For example, if you connect your IPTV Set Top Box with a Personal Video Recorder (PVR) to OpenRG's WAN-LAN bridge, you will be able to access the content recorded on the PVR from any home computer connected to OpenRG's LAN. This network configuration is called *Hybrid Bridging*. OpenRG detects LAN hosts that should be bridged to the WAN according to their MAC address or a specific DHCP option (either **Vendor Class ID**, **Client ID** or **User Class ID**). Once detected, these LAN hosts are placed under the WAN-LAN bridge, which you must add and configure for the hybrid bridging mode beforehand. To add the WAN-LAN bridge, follow the Connection Wizard steps described in Section 8.4.22.1. In the final step, check the 'Edit the Newly Created Connection' check box, and click 'Finish'. The 'Bridge Properties' screen appears.

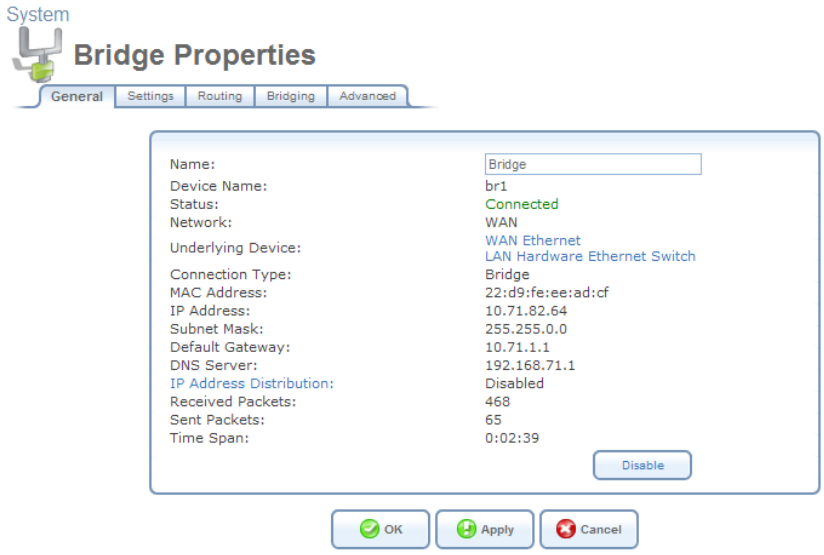


Figure 8.250. Bridge Properties

To configure the WAN-LAN bridge for the hybrid bridging mode, perform the following:

1. In the 'Bridge Properties' screen, click the 'Routing' tab. The following screen appears.

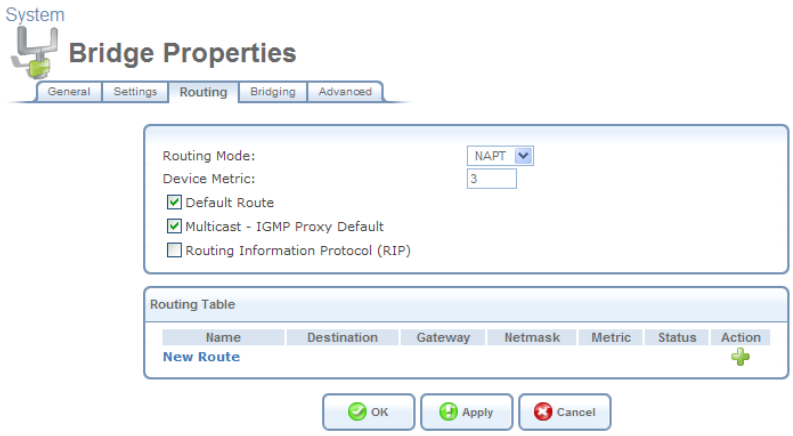


Figure 8.251. WAN-LAN Bridge Routing Settings

2. From the 'Routing Mode' drop-down menu, select 'Route' and click 'Apply'. The following warning screen appears.

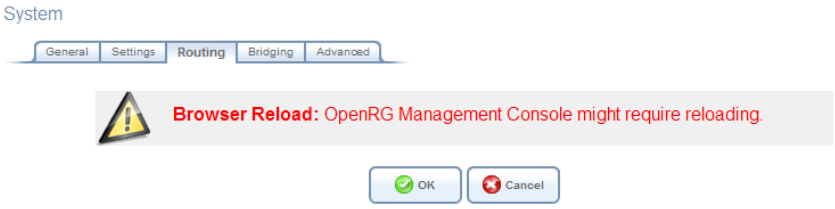


Figure 8.252. Browser Reload Warning Message

3. Click 'OK'. The page refreshes while saving the new settings, and returns to the previous screen.

4. Click the 'Bridging' tab. The following screen appears.

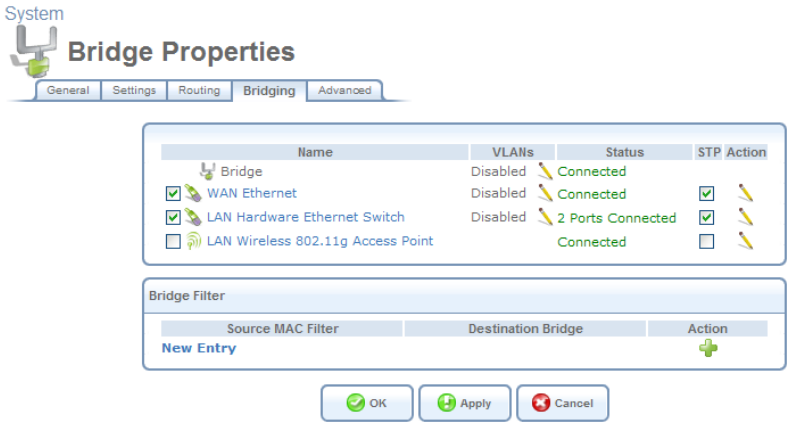


Figure 8.253. WAN-LAN Bridging Settings

5. In the 'Bridge Filter' section, click the 'New Entry' link. The following screen appears.

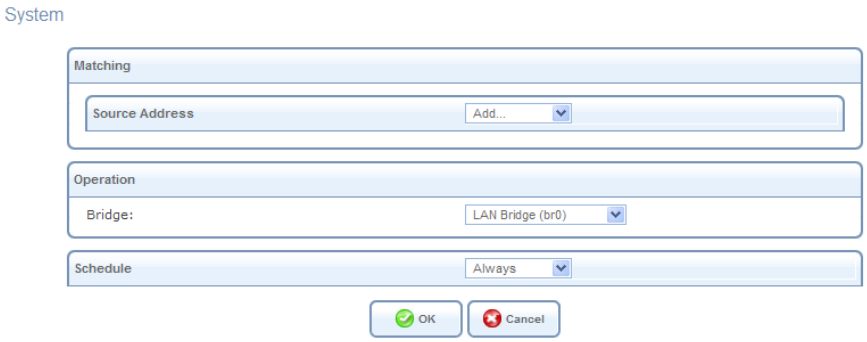


Figure 8.254. Bridge Filter Settings

6. From the drop-down menu in the 'Operation' section, select the WAN-LAN bridge. If not renamed, its default entry appears as "Bridge (br1)".

7. From the 'Source Address' drop-down menu, select 'User Defined'. The 'Edit Network Object' screen appears.

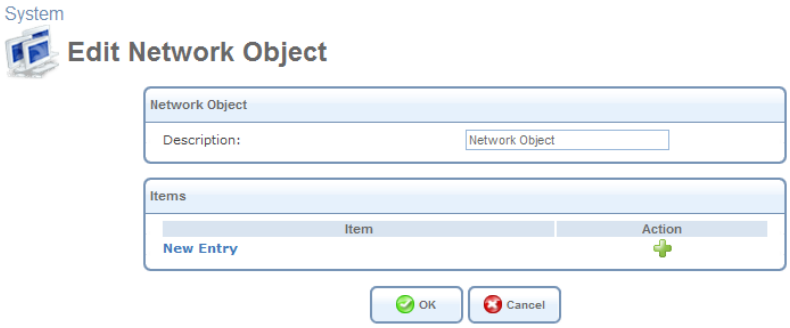


Figure 8.255. Edit Network Object

8. Click the 'New Entry' link. The 'Edit Item' screen appears.

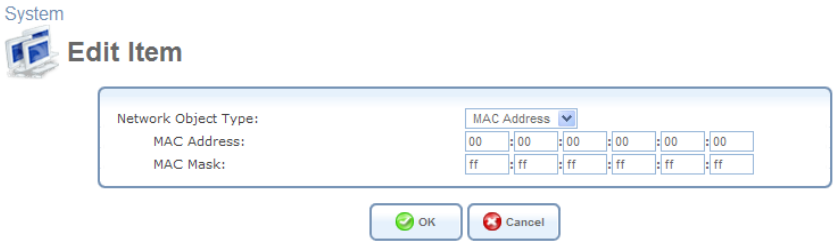


Figure 8.256. Edit Item – MAC Address

This screen enables you to create a traffic filtering rule, which enables direct packet flow between the WAN and the LAN host that will be placed under the WAN-LAN bridge. This filtering rule can be based on either a LAN host's MAC address or one of its DHCP options mentioned earlier.

9. If you wish to base this rule on the MAC address, and enter the MAC address and the MAC mask in their respective fields. Otherwise, perform the following:

   a. From the 'Network Object Type' drop-down menu, select 'DHCP Option'. The screen refreshes, changing to the following.

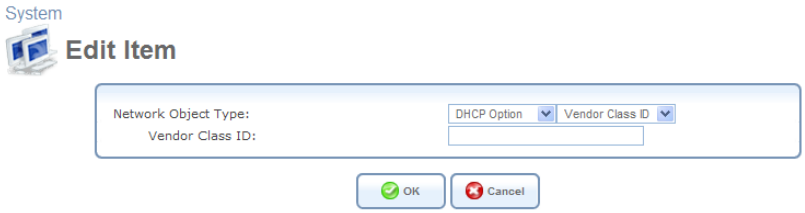


Figure 8.257. Edit Item – DHCP Options

   b. From the designated drop-down menu, select one of the DHCP options. The field below changes accordingly.

   c. Enter a relevant value for the DHCP option (should be supplied by a service provider).

10. Click 'OK' to save the settings.

8.4.22.3. General

To view and edit the WAN-LAN bridge connection settings, click the 'Bridge' link in the 'Network Connections' screen (see Figure 8.10). The 'Bridge Properties' screen will appear (see Figure 8.258), displaying a detailed

summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

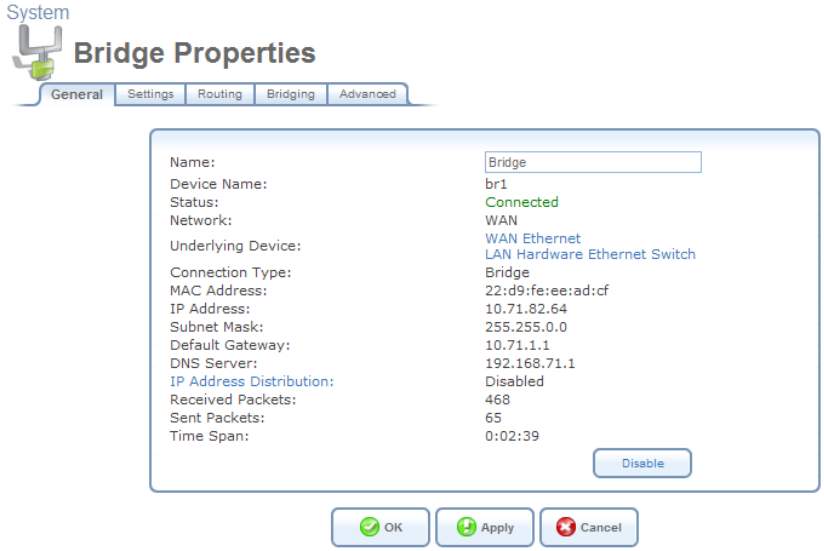


Figure 8.258. Bridge Properties

8.4.22.4. Settings

General This section displays the connection's general parameters.

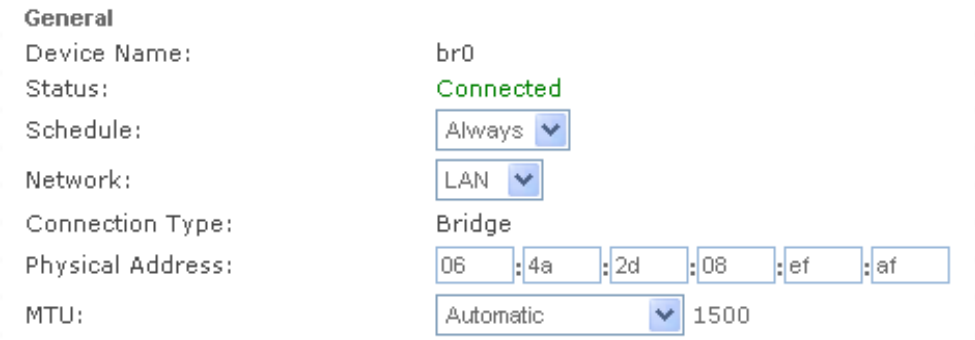


Figure 8.259. General Bridge Settings

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

Physical Address The physical address of the network card used for your network. Some cards allow you to change this address.

Clone My MAC Address Press this button to copy your PC's current MAC address to the board.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

Internet Protocol Select one of the following Internet protocol options from the 'Internet Protocol' combo-box:

- No IP Address
- Obtain an IP Address Automatically
- Use the Following IP Address

Please note that the screen will refresh to display relevant configuration settings according to your choice.

No IP Address Select 'No IP Address' if you require that your gateway have no IP address. This can be useful if you are working in an environment where you are not connected to other networks, such as the Internet.

Figure 8.260. Internet Protocol -- No IP Address

Obtain an IP Address Automatically Your connection is configured by default to act as a DHCP client. You should keep this configuration in case your service provider supports DHCP, or if you are connecting using a dynamic IP address. The server that assigns the gateway with an IP address, also assigns a subnet mask. You can override the dynamically assigned subnet mask by selecting the 'Override Subnet Mask' and specifying your own mask instead. You can press the 'Release' button to release the current leased IP address. Once the address has been released, the button text changes to 'Renew'. Use the 'Renew' button to renew the leased IP address.

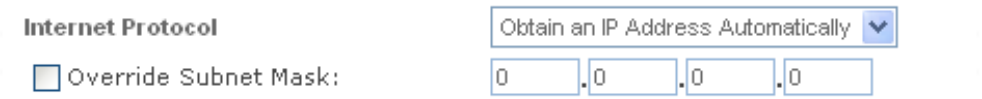


Figure 8.261. Internet Protocol Settings -- Automatic IP

Use the Following IP Address Your connection can be configured using a permanent (static) IP address. Your service provider should provide you with such an IP address and subnet mask.

Figure 8.262. Internet Protocol -- Static IP

DNS Server Domain Name System (DNS) is the method by which Web site domain names are translated into IP addresses. You can configure the connection to automatically obtain a DNS server address, or specify such an address manually, according to the information provided by your ISP. To configure the connection to automatically obtain a DNS server address, select 'Obtain DNS Server Address Automatically' from the 'DNS Server' drop down menu.

Figure 8.263. DNS Server -- Automatic IP

To manually configure DNS server addresses, select 'Use the Following DNS Server Addresses' from the 'DNS Server' drop down menu (see figure 'DNS Server -- Static IP'). Specify up to two different DNS server address, one primary, another secondary.

Figure 8.264. DNS Server -- Static IP

To learn more about this feature, turn to chapter Section 7.13.1 .

IP Address Distribution The 'IP Address Distribution' section allows you to configure the gateway's Dynamic Host Configuration Protocol (DHCP) server parameters. The DHCP automatically assigns IP addresses to network PCs. If you enable this feature, make sure that you also configure your network PCs as DHCP clients. For a comprehensive description of this feature, please refer to section Section 7.13.2 . Select one of the following options from the 'IP Address Distribution' combo-box:

- DHCP Server

1. **Start IP Address** The first IP address that may be assigned to a LAN host. Since the gateway's default IP address is 192.168.1.1, this address must be 192.168.1.2 or greater.

   End IP Address The last IP address in the range that can be used to automatically assign IP addresses to LAN hosts.

   Subnet Mask A mask used to determine to what subnet an IP address belongs. An example of a subnet mask value is 255.255.0.0.

   Lease Time In Minutes Each device will be assigned an IP address by the DHCP server for a this amount of time, when it connects to the network. When the lease expires the server will determine if the computer has disconnected from the network. If it has, the server may reassign this IP address to a newly-connected computer. This feature ensures that IP addresses that are not in use will become available for other computers on the network.

   Provide Host Name If Not Specified by Client If the DHCP client does not have a host name, the gateway will automatically assign one for him.

2. Click 'OK' to save the settings.

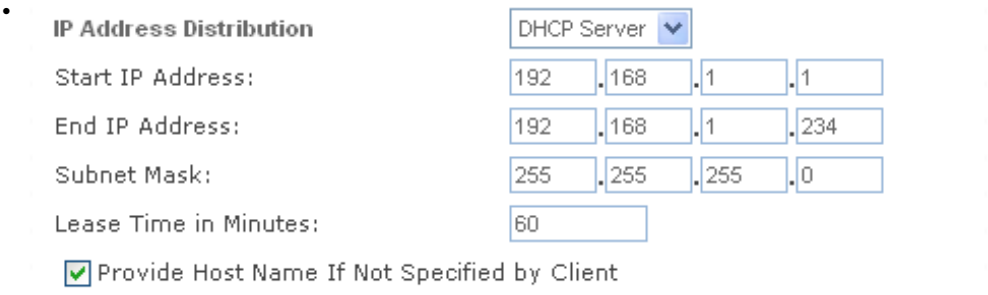

IP Address Distribution
DHCP Server
Start IP Address:
192 . 168 . 1 . 1
End IP Address:
192 . 168 . 1 . 234
Subnet Mask:
255 . 255 . 255 . 0
Lease Time in Minutes:
60
Provide Host Name If Not Specified by Client

Figure 8.265. IP Address Distribution -- DHCP Server

- DHCP Relay Your gateway can act as a DHCP relay in case you would like to dynamically assign IP addresses from a DHCP server other than your gateway's DHCP server. Note that when selecting this option you must also change OpenRG's WAN to work in routing mode. For more information, see section Section 7.13.2.2 .

  1. After selecting 'DHCP Relay' from the drop down menu, a 'New IP Address' link will appear:

Figure 8.266. IP Address Distribution - DHCP Relay

Click the 'New IP Address' link. The 'DHCP Relay Server Address' screen will appear:

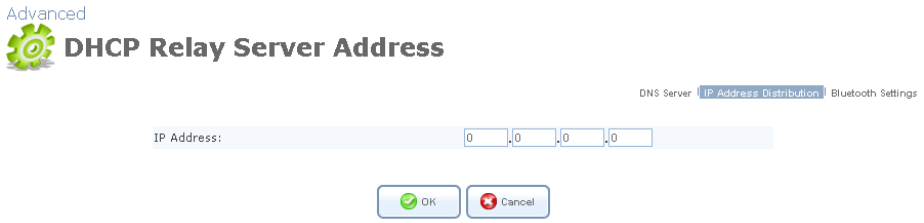


Figure 8.267. DHCP Relay Server Address

2. Specify the IP address of the DHCP server.
3. Click 'OK' to save the settings.

- Disabled Select 'Disabled' from the combo-box if you would like to statically assign IP addresses to your network computers.

Figure 8.268. IP Address Distribution - Disable DHCP

8.4.22.5. Routing

You can choose to setup your gateway to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Routing Mode Select one of the following routing modes:

Route Use route mode if you want your gateway to function as a router between two networks.

NAPT Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.

Device Metric The device metric is a value used by the gateway to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.

Default Route Select this check box to define this device as a the default route.

Routing Information Protocol (RIP) Select this check box to enable the Routing Information Protocol (RIP). RIP determines a route based on the smallest hop count between source and destination. When RIP is enabled, select the following:

- Listen to RIP messages - select 'None', 'RIPv1', 'RIPv2' or 'RIPv1/2'.
- Send RIP messages - select 'None', 'RIPv1', 'RIPv2-broadcast' or 'RIPv2-multicast'.

Multicast - IGMP Proxy Internal IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast

packets according to the IGMP requests of LAN devices asking to join multicast groups. Select the 'Multicast IGMP Proxy Internal' check-box to enable this feature.

IGMP Query Version OpenRG supports all three versions of IGMP. Select the version you would like to use.

Routing Table Allows you to add or modify routes when this device is active. Use the 'New Route' button to add a route or edit existing routes.

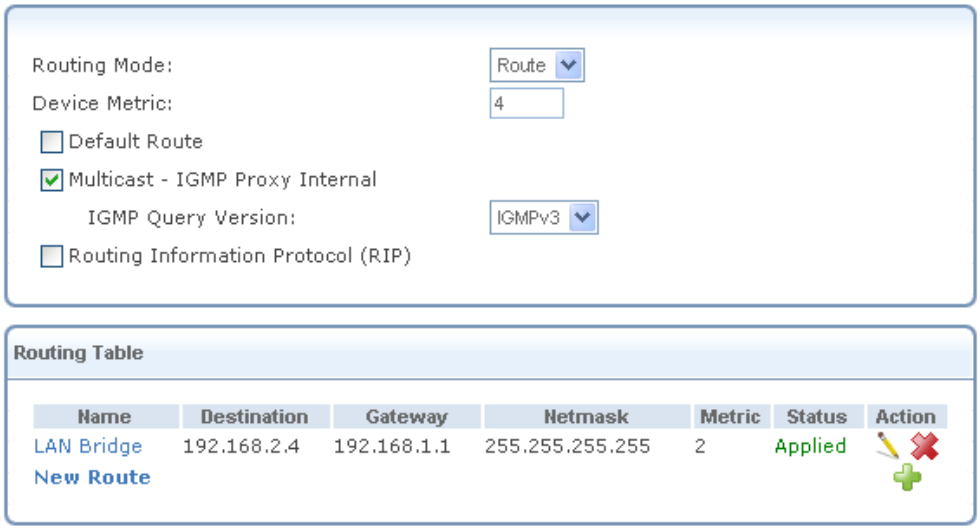


Figure 8.269. Advanced Routing Properties

To learn more about this feature, please refer to chapter Section 8.6.1 .

8.4.22.6. Bridging

This section allows you to specify the devices that you would like to join under the network bridge. Click the action icon under the 'VLANs' column to assign the network connections to specific virtual LANS. Select the 'STP' check box to enable the Spanning Tree Protocol on the device. You should use this to ensure that there are no loops in your network configuration, and apply these settings in case your network consists of multiple switches, or other bridges apart from those created by the gateway.

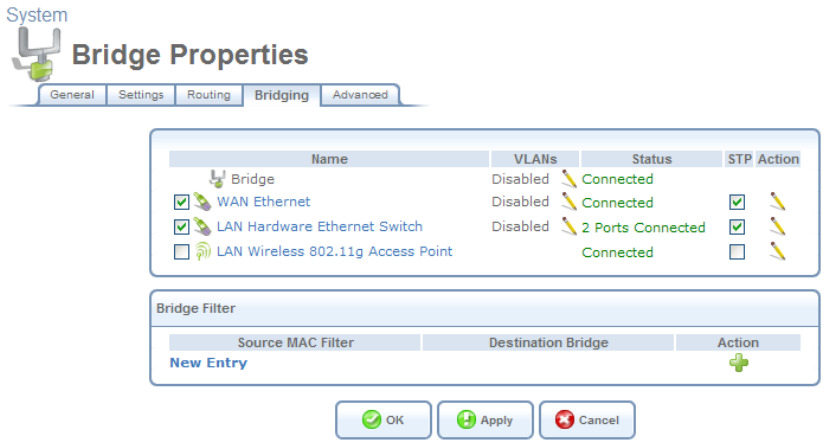


Figure 8.270. Bridge Settings

8.4.22.7. IPv6

Click on the 'New Unicast Address' link to add an IPv6 unicast address. To learn more about configuring IPv6 settings, refer to Section 8.6.2.

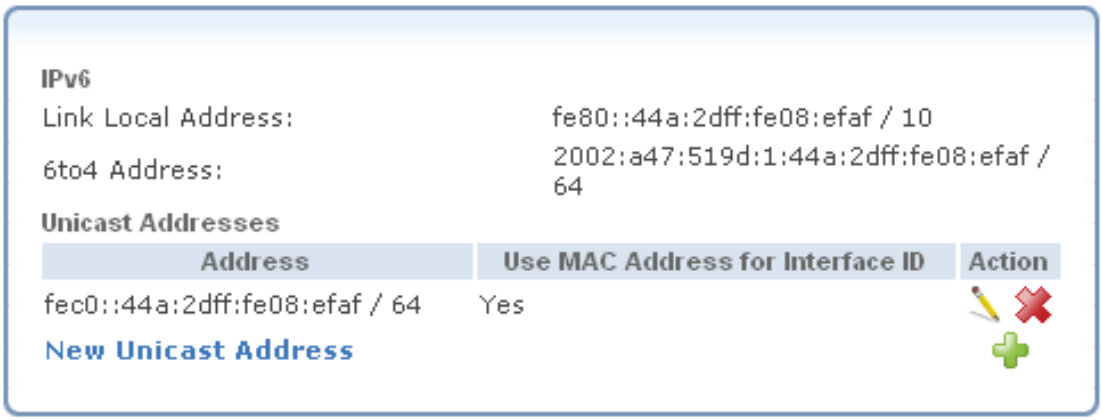


Figure 8.271. IPv6 Settings

8.4.22.8. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

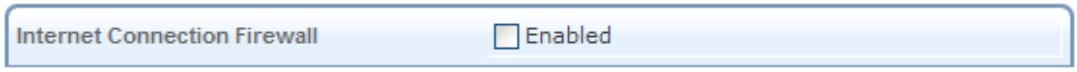


Figure 8.272. Internet Connection Firewall

- **Additional IP Addresses** You can add alias names (additional IP addresses) to the gateway by clicking the 'New IP Address' link. This enables you to access the gateway using these aliases in addition to the 192.168.1.1 and the http://openrg.home.

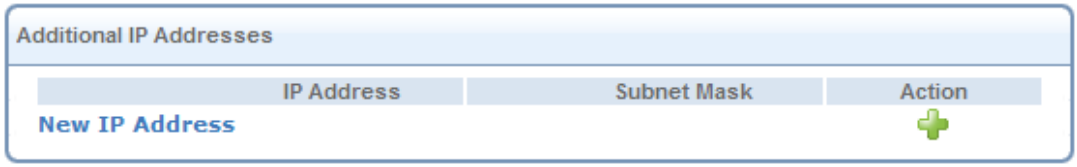


Figure 8.273. Additional IP Addresses

8.4.23. Virtual LAN Interface (VLAN)

OpenRG allows you to create Virtual LAN (VLAN) interfaces in order to connect to external virtual networks.

8.4.23.1. Creation with the Connection Wizard

To create a new VLAN interface, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.11).

2. Select the Advanced Connection radio button and click Next. The 'Advanced Connection' screen will appear (see figure Figure 8.16).

1. Select the VLAN Interface radio button and click Next. The 'VLAN Interface' screen will appear (see figure Figure 8.274).

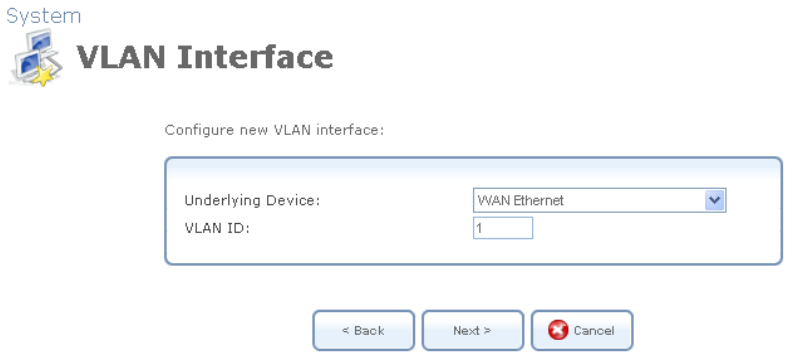


Figure 8.274. VLAN Interface

2. Select the underlying device for this interface. The combo box will display OpenRG's ethernet connections.

3. Enter a value that will serve as the VLAN ID, and click Next. The 'Connection Summary' screen will appear (see figure Figure 8.275).

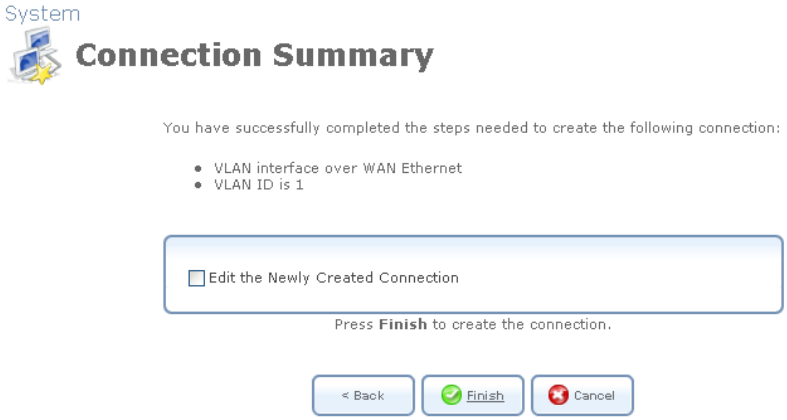


Figure 8.275. Connection Summary

4. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

5. Click Finish to save the settings.

The new VLAN interface will be added to the network connections list, and will be configurable like any other connection.

8.4.23.2. General

To view and edit the VLAN interface settings, click the 'WAN Ethernet 2' link in the 'Network Connections' screen (see figure Figure 8.10). The 'WAN Ethernet 2 Properties' screen will appear (see figure Figure 8.276), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

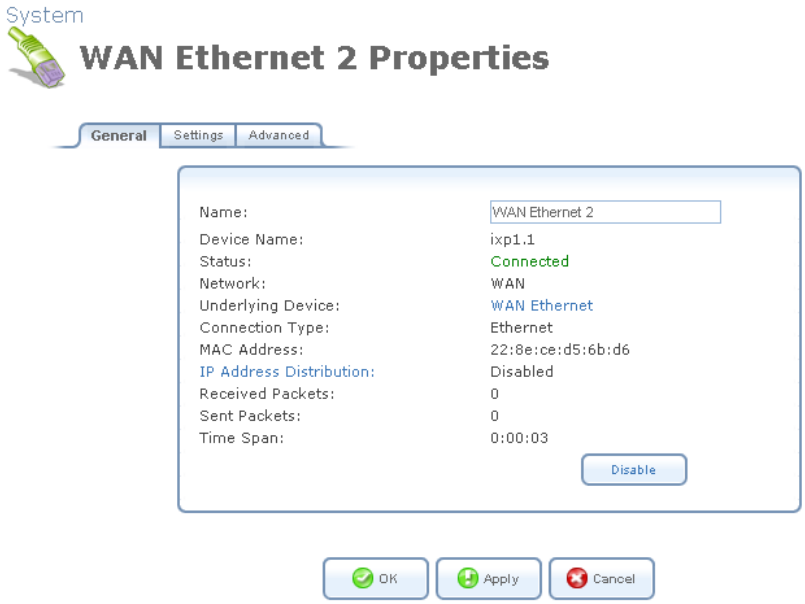


Figure 8.276. WAN Ethernet 2 Properties

8.4.23.3. Settings

General This section displays the connection's general parameters.

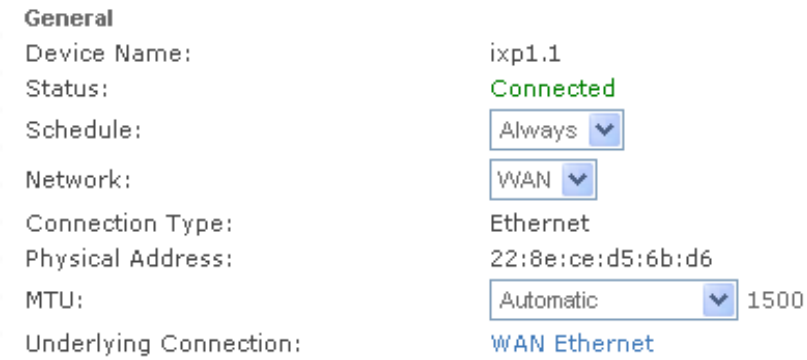


Figure 8.277. General VLAN Interface Settings

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

Physical Address The physical address of the network card used for your network. Some cards allow you to change this address.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

Underlying Connection The ethernet device that the connection is implemented over.

Internet Protocol Select one of the following Internet protocol options from the 'Internet Protocol' combo-box:

- No IP Address
- Obtain an IP Address Automatically
- Use the Following IP Address

Please note that the screen will refresh to display relevant configuration settings according to your choice.

No IP Address Select 'No IP Address' if you require that your gateway have no IP address. This can be useful if you are working in an environment where you are not connected to other networks, such as the Internet.

Figure 8.278. Internet Protocol -- No IP Address

Obtain an IP Address Automatically Your connection is configured by default to act as a DHCP client. You should keep this configuration in case your service provider supports DHCP, or if you are connecting using a dynamic IP address. The server that assigns the gateway with an IP address, also assigns a subnet mask. You can override the dynamically assigned subnet mask by selecting the 'Override Subnet Mask' and specifying your own mask instead. You can press the 'Release' button to release the current leased IP address. Once the address has been released, the button text changes to 'Renew'. Use the 'Renew' button to renew the leased IP address.

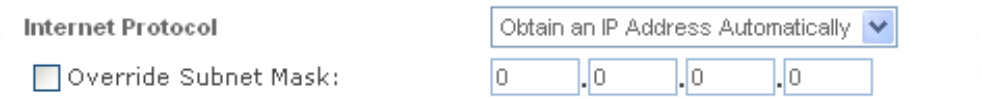


Figure 8.279. Internet Protocol Settings -- Automatic IP

Use the Following IP Address Your connection can be configured using a permanent (static) IP address. Your service provider should provide you with such an IP address and subnet mask.

Figure 8.280. Internet Protocol -- Static IP

8.4.23.4. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

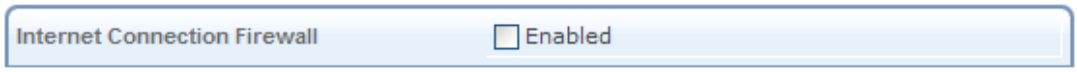


Figure 8.281. Internet Connection Firewall

Internet Connection Fastpath Select this check box to utilize the *Fastpath* algorithm for enhancing packet flow, resulting in faster communication between the LAN and the WAN. By default, this feature is enabled.

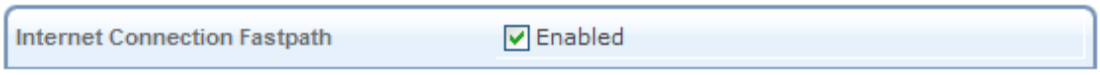


Figure 8.282. Internet Connection Fastpath

- **Additional IP Addresses** You can add alias names (additional IP addresses) to the gateway by clicking the 'New IP Address' link. This enables you to access the gateway using these aliases in addition to the 192.168.1.1 and the http://openrg.home.

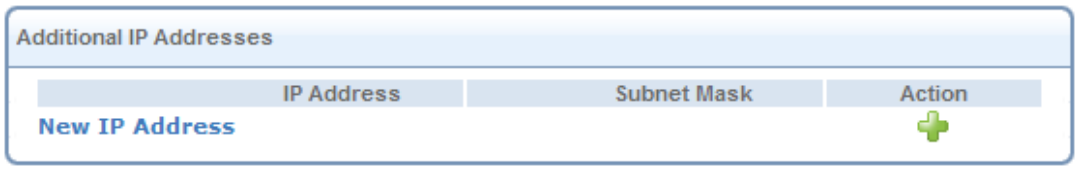


Figure 8.283. Additional IP Addresses

8.4.23.5. DSCP Remark According to 802.1p CoS

When creating a VLAN interface over a LAN connection, it is possible to determine the IP header's Differentiated Services Code Point (DSCP) priority value according to the VLAN header's 802.1p Class of Service (CoS) tag. The DSCP value can then be used for Quality of Service (Qos) traffic prioritization. For more information, please refer to chapter Section 7.4 .

1. Check the Enabled check-box. The screen will refresh, presenting a table (see section Figure 8.284).

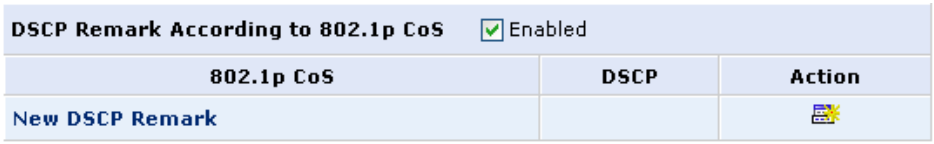


Figure 8.284. DSCP Remark According to 802.1p CoS

2. Click the New DSCP Remark link. The following screen will appear:

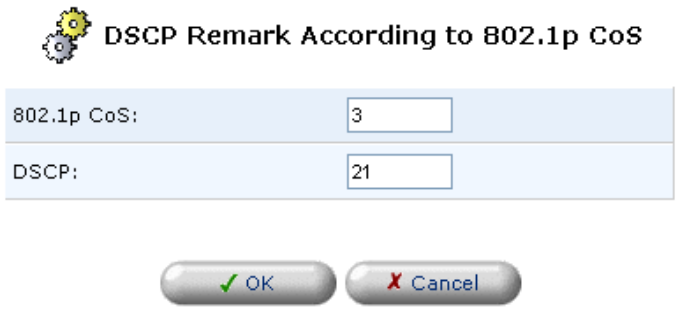


Figure 8.285. DSCP Remark According to 802.1p CoS

3. Enter the 802.1p CoS and DSCP values to be associated, and click 'OK'. The new pair of values will appear in the table.

4. Click 'OK' to save the settings.

8.4.23.6. VLAN Use Case

The following example demonstrates the advantages of a VLAN interface through practical setup and performance measurements. The VLAN interface in this example is used to grant prioritization to specific traffic, providing a basic level of Quality of Service (see chapter Section 7.4).

8.4.23.6.1. Hardware Requirements

This use case requires the following:

- A development board
- Two equal Linux LAN hosts holding two identical 100MB files
- A 10 Mbps switch (optional)
- A WAN host serving as an FTP server

8.4.23.6.2. Physical Setup

Since this example requires overloading the WAN, the WAN network segment bandwidth must be less than the LAN's. This can be achieved, for example, by either connecting OpenRG's WAN to 10 Mbps switch, or forcing the FTP server's WAN interface to 10 Mbps.

1. Connect the two LAN hosts to the development board's LAN ports.
2. Connect the board's WAN port to the 10 Mbps switch, and the switch to the WAN.

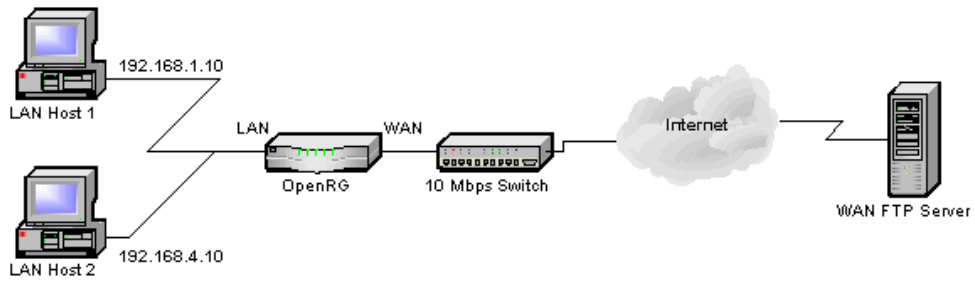


Figure 8.286. Physical Setup

8.4.23.6.3. OpenRG Configuration

To configure the VLAN interface, perform the following steps:

1. In the 'Network Connections' screen, delete the LAN bridge (if one exists) by clicking its action icon . Click 'OK' in the attention screen to confirm the deletion. The LAN Ethernet that was enslaved to the bridge will automatically be configured with the IP address 192.168.1.1, and serve as the DHCP server for this subnet.
2. Create a VLAN interface over the LAN Ethernet, using the Advanced utility of the connection wizard. The underlying device should be LAN Ethernet (or LAN Hardware Ethernet Switch, depending on your platform). Set the VLAN ID to 100.

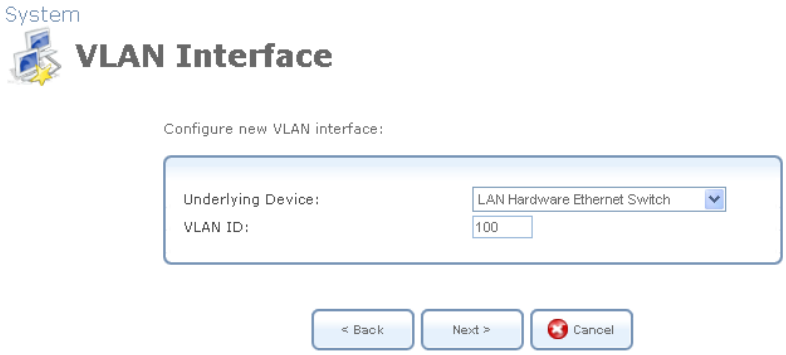


Figure 8.287. VLAN Interface Configuration

3. In the 'Connection Summary' screen, check the 'Edit the Newly Created Connection' check box and click Finish. The 'LAN Ethernet Properties' screen appears:

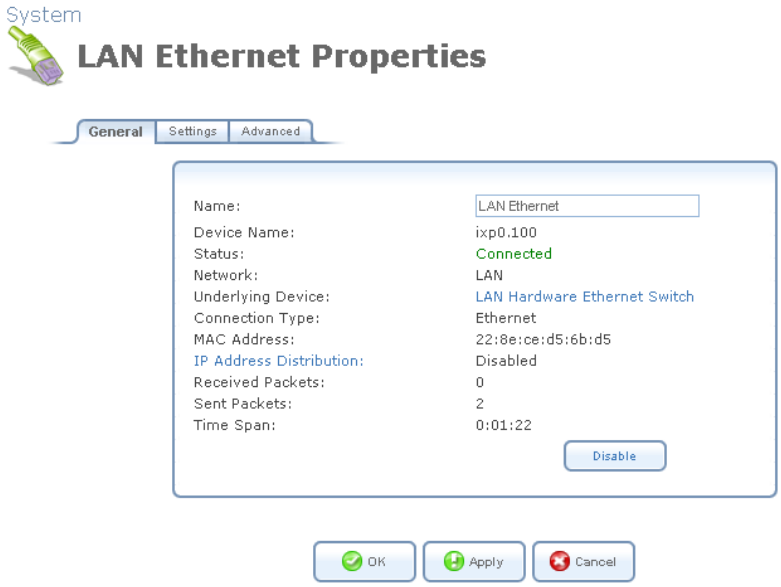


Figure 8.288. LAN Ethernet Properties

4. Click the Settings tab, and in the Internet Protocol section, select "Use the Following IP Address" from the combo box. The screen refreshes (see figure Figure 8.289).

5. Enter 192.168.4.1 as the IP address and 255.255.255.0 as the subnet mask.

Figure 8.289. Internet Protocol

6. In the IP Address Distribution section, select "DHCP Server" from the combo-box. The screen will refresh (see figure Figure 8.290).

7. Enter 192.168.4.2 as the start IP address and 192.168.4.254 as the end IP address. Enter 255.255.255.0 as the subnet mask. Leave all other fields at their defaults.

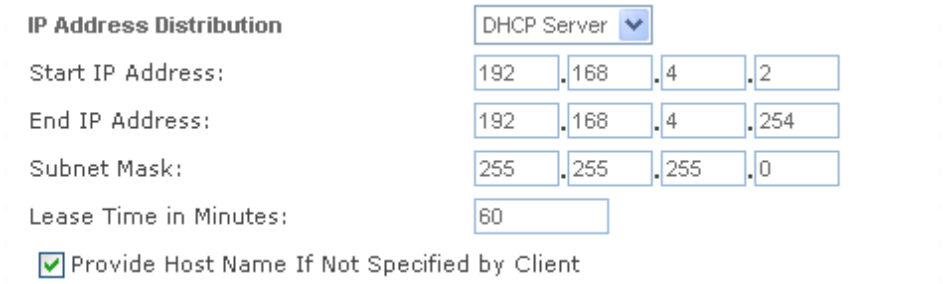

IP Address Distribution
DHCP Server
Start IP Address:
192 . 168 . 4 . 2
End IP Address:
192 . 168 . 4 . 254
Subnet Mask:
255 . 255 . 255 . 0
Lease Time in Minutes:
60
Provide Host Name If Not Specified by Client

Figure 8.290. IP Address Distribution

8. Click the Advanced tab, and verify that the Internet Connection Firewall is disabled.

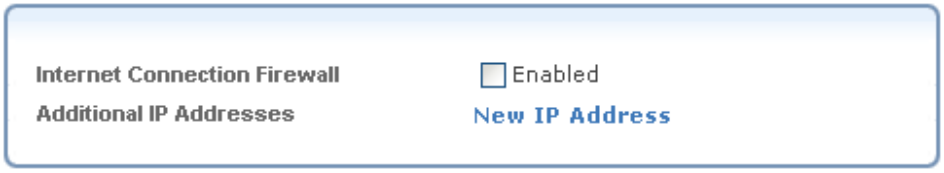


Figure 8.291. Internet Connection Firewall

9. Click 'OK' to save the settings.

8.4.23.6.4. Host 1 Configuration

This computer will act as an ordinary LAN host connected to OpenRG with no special settings. After connecting the computer to the gateway, use the following command (in the Linux shell command line) to obtain an IP address from OpenRG:

```
# pump -i eth0
```

Verify that the obtained IP address is in OpenRG's default subnet (192.168.1.x) using this command:

```
# ifconfig eth0
```

8.4.23.6.5. Host 2 Configuration

This computer will act as a VLAN-capable host connected to OpenRG. Use the following command to create the VLAN interface (verify that the `vconfig` utility is installed on this host's Linux operating system):

```
# vconfig add eth0 100
```

After connecting the computer to the gateway, use the following command (in the Linux shell command line) to obtain an IP address from OpenRG:

```
# pump -i eth0.100
```

Verify that the obtained IP address is in OpenRG's VLAN subnet (192.168.4.x) using this command:

```
# ifconfig eth0.100
```

8.4.23.6.6. Running the Scenario

1. Open an FTP connection from both hosts to the WAN FTP server. Use an FTP client that displays throughput rates.

2. Initiate an FTP **upload** of the 100MB files from both hosts to the server simultaneously. Observe that the throughput rates on both hosts are similar - approximately half of the forced WAN bandwidth (5MB each).

3. Configure the VLAN interface of Host 2 to add priority to VLAN frames, using the following command:

```
# vconfig set_egress_map eth0.100 0 7
```

4. Repeat the FTP upload test and observe that the throughput rate of Host 2 increases significantly at the expense of Host 1.

8.4.24. Routed IP over ATM (IPoA)

Routed IP over ATM (IPoA) is a standard for transmitting IP traffic in an ATM network.

8.4.24.1. Creation with the Connection Wizard

To create a new IPoA connection, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.18).

2. Select the Advanced Connection radio button and click Next. The 'Advanced Connection' screen will appear (see figure Figure 8.23).

3. Select the Routed IP over ATM (IPoA) radio button and click Next. The 'Routed IP over ATM (IPoA)' screen will appear (see figure Figure 8.292).

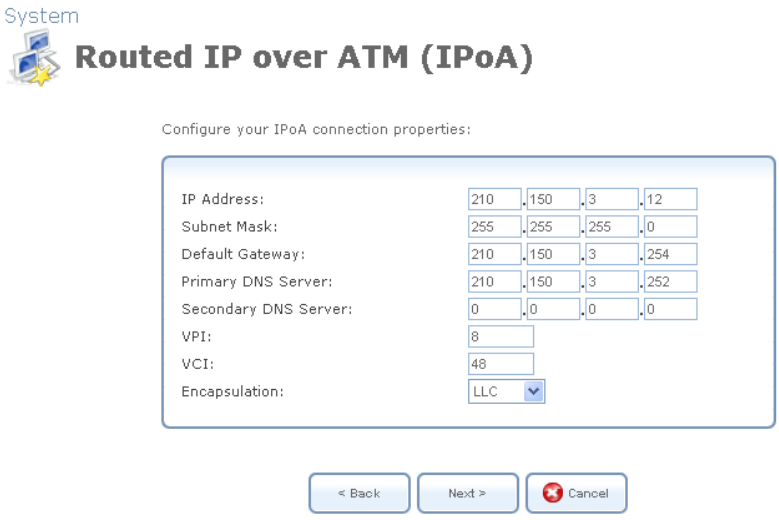

System
Routed IP over ATM (IPoA)
Configure your IPoA connection properties:
IP Address: 210 . 150 . 3 . 12
Subnet Mask: 255 . 255 . 255 . 0
Default Gateway: 210 . 150 . 3 . 254
Primary DNS Server: 210 . 150 . 3 . 252
Secondary DNS Server: 0 . 0 . 0 . 0
VPI: 8
VCI: 48
Encapsulation: LLC
< Back
Next >
Cancel

Figure 8.292. Routed IP over ATM

4. Enter the following information, which should be provided to you by your Internet Service Provider (ISP):

   - IP Address
   - Subnet Mask
   - Default Gateway
   - Primary DNS Server
   - Secondary DNS Server

- The VPI and VCI pair of identifiers
- The encapsulation method: LLC or VCMux

5. Click Next. The 'Connection Summary' screen will appear (see figure Figure 8.293).

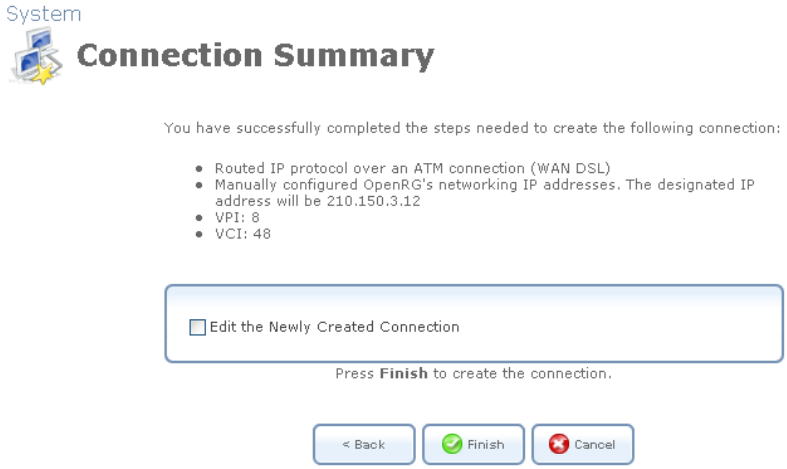

System
Connection Summary
You have successfully completed the steps needed to create the following connection:
Routed IP protocol over an ATM connection (WAN DSL)
Manually configured OpenRG's networking IP addresses. The designated IP address will be 210.150.3.12
VPI: 8
VCI: 48
Edit the Newly Created Connection
Press Finish to create the connection.
< Back
Finish
Cancel

Figure 8.293. Connection Summary

6. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.
7. Click Finish to save the settings.

The new IPoA connection will be added to the network connections list, and will be configurable like any other connection.

8.4.24.2. General

To view and edit the IPoA connection settings, click the 'WAN IPoA' link in the 'Network Connections' screen (see figure Figure 8.10). The 'Routed IP over ATM Properties' screen will appear (see figure Figure 8.294), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

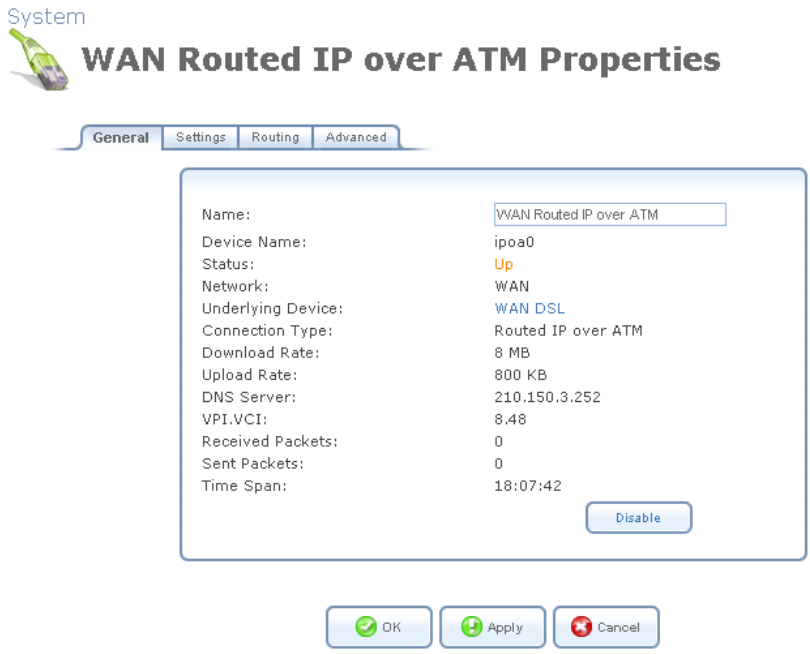


Figure 8.294. Routed IP over ATM Properties

8.4.24.3. Settings

General This section displays the connection's general parameters.

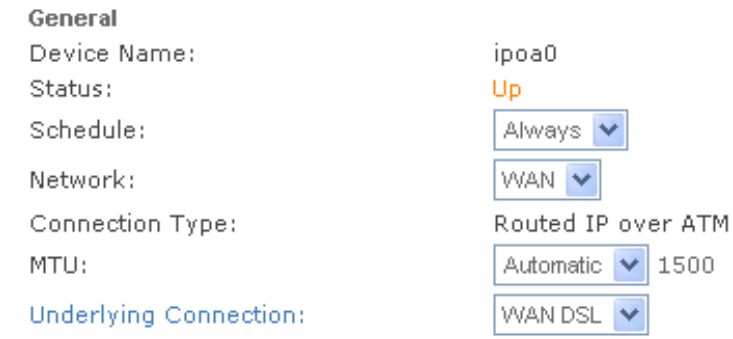


Figure 8.295. General IPoA Settings

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

Underlying Connection Specify the underlying connection above which the protocol will be initiated.

ATM

Asynchronous Transfer Mode (ATM) is a network technology based on transferring data in cells or packets of a fixed size. The cell used with ATM is relatively small compared to units used with other technologies. The small, constant cell size allows the transmission of video, audio, and computer data, assuring that no single type of data consumes the connection. ATM addressing consists of two identifiers that identify the virtual path (VPI) and the virtual connection (VCI). A virtual path consists of multiple virtual channels to the same endpoint.
The 'Encapsulation' for connection should be set to either 'LLC' or 'VCMux'. You should configure these parameters according to the information provided by your ISP.

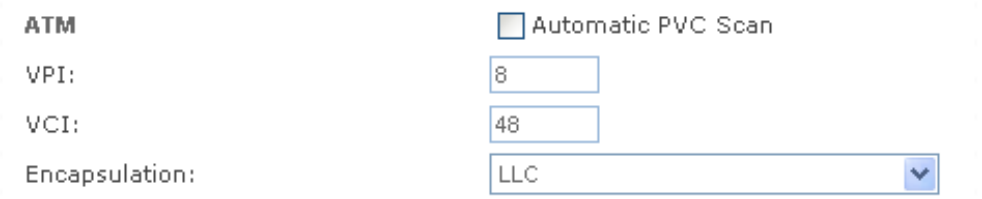


Figure 8.296. ATM Settings

Internet Protocol This connection always uses a specified IP address. Your service provider should provide you with this IP address, subnet mask, the default gateway and DNS server.

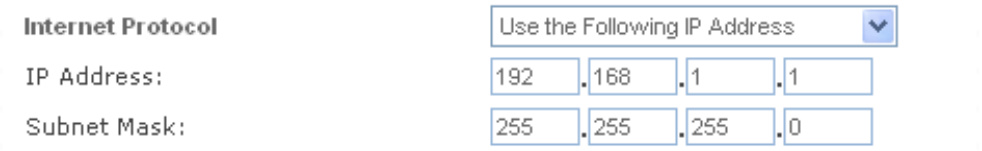


Figure 8.297. Internet Protocol Settings - Static IP

8.4.24.4. Routing

You can choose to setup your gateway to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Routing Mode Select one of the following routing modes:

Route Use route mode if you want your gateway to function as a router between two networks.

NAPT Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.

Device Metric The device metric is a value used by the gateway to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.

Default Route Select this check box to define this device as a the default route.

Routing Information Protocol (RIP) Select this check box to enable the Routing Information Protocol (RIP). RIP determines a route based on the smallest hop count between source and destination. When RIP is enabled, select the following:

- Listen to RIP messages - select 'None', 'RIPv1', 'RIPv2' or 'RIPv1/2'.
- Send RIP messages - select 'None', 'RIPv1', 'RIPv2-broadcast' or 'RIPv2-multicast'.

Multicast - IGMP Proxy Internal IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups. Select the 'Multicast IGMP Proxy Internal' check-box to enable this feature.

IGMP Query Version OpenRG supports all three versions of IGMP. Select the version you would like to use.

Routing Table Allows you to add or modify routes when this device is active. Use the 'New Route' button to add a route or edit existing routes.

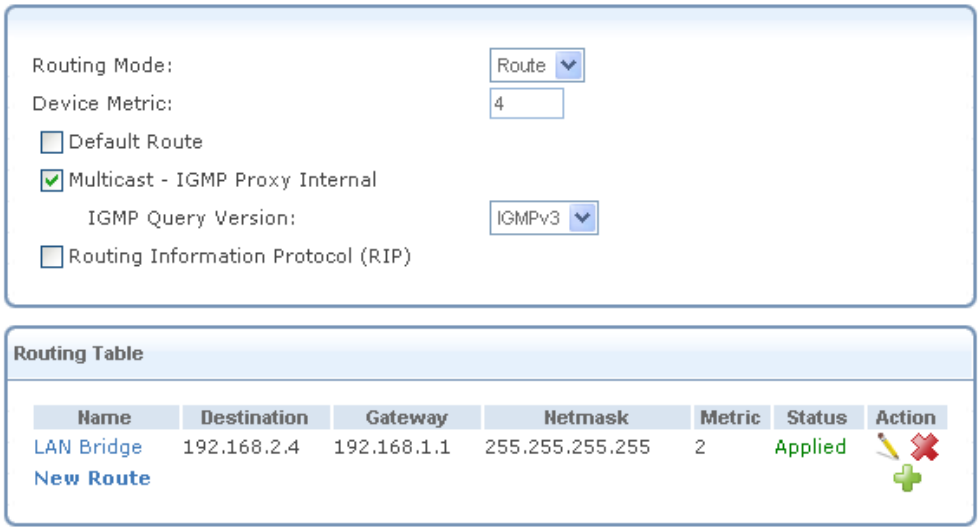


Figure 8.298. Advanced Routing Properties

To learn more about this feature, please refer to chapter Section 8.6.1 .

8.4.24.5. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

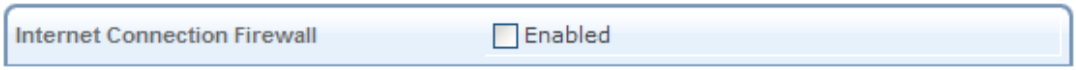


Figure 8.299. Internet Connection Firewall

8.4.25. Internet Protocol over Internet Protocol (IPIP)

OpenRG allows you to create an IPIP tunnel to another router, by encapsulating IP packets in IP. This tunnel can be managed as any other network connection. Supported by many routers, this protocol enables using multiple network schemes. Note, however, that IPIP tunnels are not secured.

8.4.25.1. Creation with the Connection Wizard

To create a new IPIP tunnel, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.11).

2. Select the Advanced Connection radio button and click Next. The 'Advanced Connection' screen will appear (see figure Figure 8.16).

1. Select the Internet Protocol over Internet Protocol (IPIP) radio button and click Next. The 'Internet Protocol over Internet Protocol (IPIP)' screen appears:

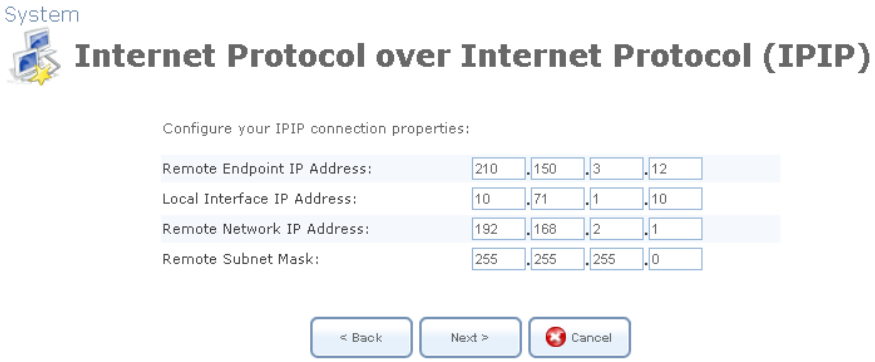

System
Internet Protocol over Internet Protocol (IPIP)
Configure your IPIP connection properties:
Remote Endpoint IP Address: 210 . 150 . 3 . 12
Local Interface IP Address: 10 . 71 . 1 . 10
Remote Network IP Address: 192 . 168 . 2 . 1
Remote Subnet Mask: 255 . 255 . 255 . 0
< Back
Next >
Cancel

Figure 8.300. Internet Protocol over Internet Protocol (IPIP)

2. Enter the tunnel's remote endpoint IP address.

3. Enter the local IP address for the interface.

4. Enter the IP address and subnet mask of the remote network that will be accessed via the tunnel, and click Next. The 'Connection Summary' screen appears:

Figure 8.301. Connection Summary

5. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

6. Click Finish to save the settings.

The new IPIP tunnel will be added to the network connections list, and will be configurable like any other connection.

8.4.25.2. General

To view and edit the IPIP connection settings, click the 'WAN IPIP' link in the 'Network Connections' screen (see figure Figure 8.10). The 'WAN IPIP Properties' screen will appear (see figure Figure 8.302), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

Figure 8.302. WAN IPIP Properties

8.4.25.3. Settings

General This section displays the connection's general parameters.

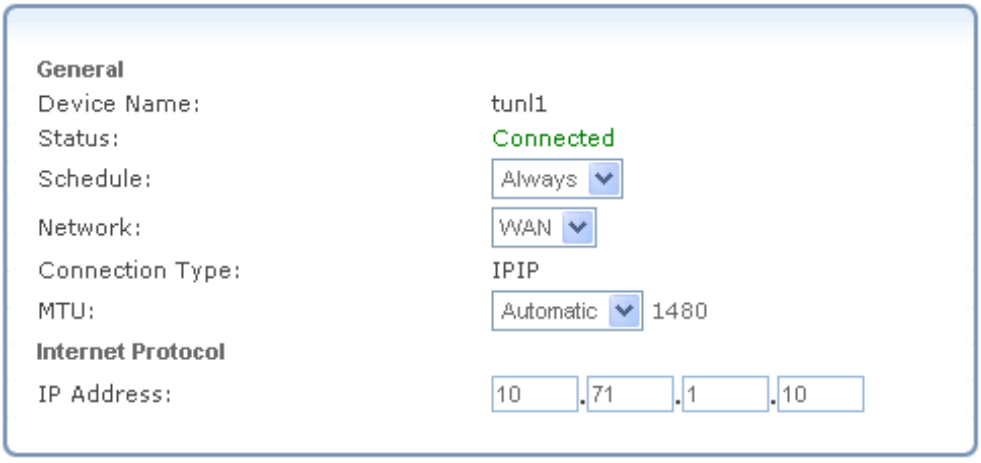


Figure 8.303. General WAN IPIP Settings

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

Internet Protocol The local IP address for the interface.

8.4.25.4. Routing

You can choose to setup your gateway to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Routing Mode Select one of the following routing modes:

Route Use route mode if you want your gateway to function as a router between two networks.

NAPT Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.

Device Metric The device metric is a value used by the gateway to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.

Default Route Select this check box to define this device as a the default route.

Routing Information Protocol (RIP) Select this check box to enable the Routing Information Protocol (RIP). RIP determines a route based on the smallest hop count between source and destination. When RIP is enabled, select the following:

- Listen to RIP messages - select 'None', 'RIPv1', 'RIPv2' or 'RIPv1/2'.
- Send RIP messages - select 'None', 'RIPv1', 'RIPv2-broadcast' or 'RIPv2-multicast'.

Multicast - IGMP Proxy Internal IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups. Select the 'Multicast IGMP Proxy Internal' check-box to enable this feature.

IGMP Query Version OpenRG supports all three versions of IGMP. Select the version you would like to use.

Routing Table Allows you to add or modify routes when this device is active. Use the 'New Route' button to add a route or edit existing routes.

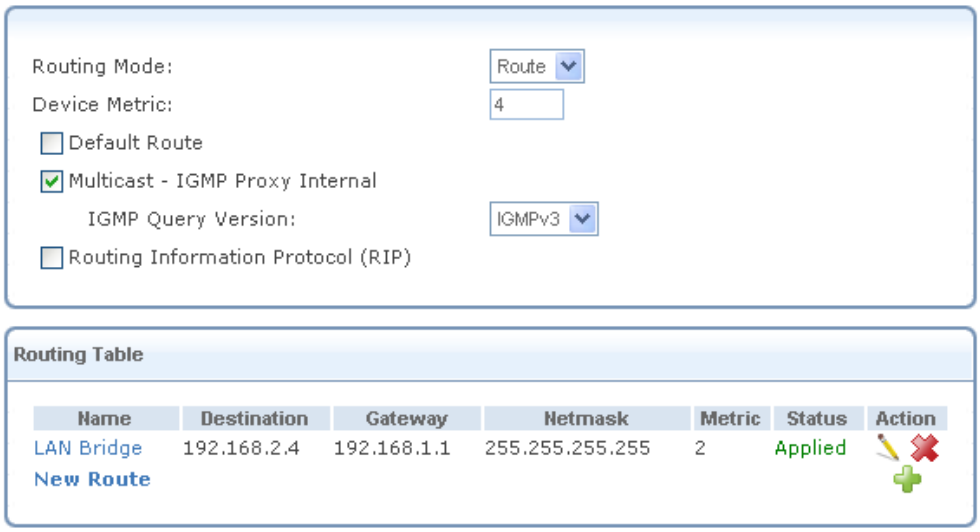


Figure 8.304. Advanced Routing Properties

To learn more about this feature, please refer to chapter Section 8.6.1 .

8.4.25.5. IPIP

The tunnel's remote endpoint IP address.

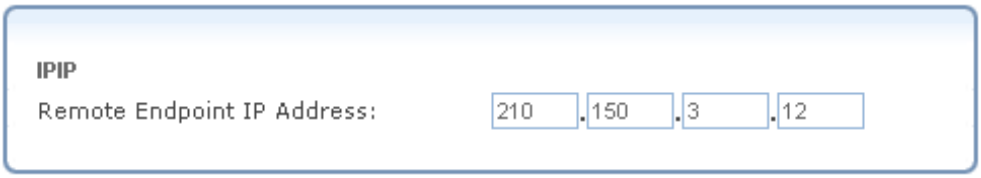


Figure 8.305. IPIP

8.4.25.6. Advanced

- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

Figure 8.306. Internet Connection Firewall

8.4.26. General Routing Encapsulation (GRE)

OpenRG allows you to create a GRE tunnel in order to transport multicast traffic and IPv6, in addition to other existing tunneling capabilities (e.g. IPIP, L2TP, PPTP).

8.4.26.1. Creation with the Connection Wizard

To create a new GRE tunnel, perform the following steps:

1. Click the New Connection link in the 'Network Connections' screen (see figure Figure 8.10). The 'Connection Wizard' screen will appear (see figure Figure 8.11).

2. Select the Advanced Connection radio button and click Next. The 'Advanced Connection' screen will appear (see figure Figure 8.16).

1. Select the General Routing Encapsulation (GRE) radio button and click Next. The 'General Routing Encapsulation (GRE)' screen appears:

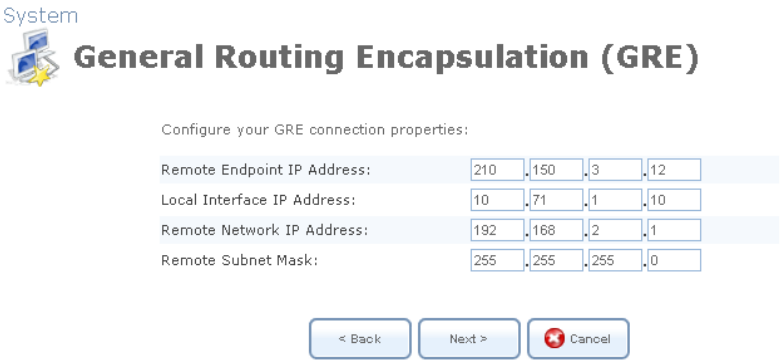


Figure 8.307. General Routing Encapsulation (GRE)

2. Enter the tunnel's remote endpoint IP address.

3. Enter the local IP address for the interface.

4. Enter the IP address and subnet mask of the remote network that will be accessed via the tunnel, and click Next. The 'Connection Summary' screen appears:

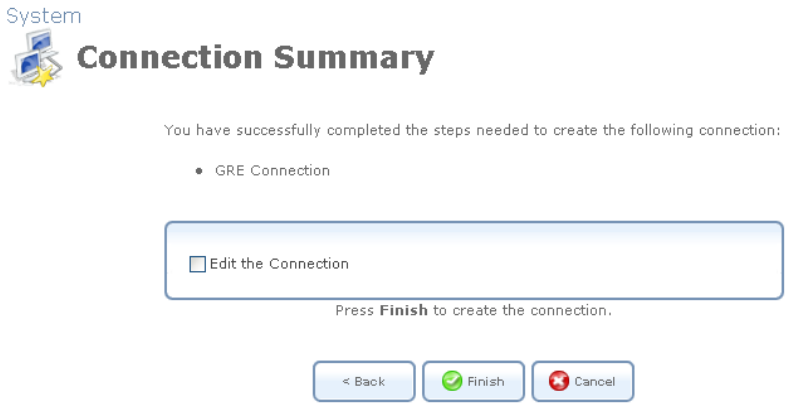


Figure 8.308. Connection Summary

5. Check the 'Edit the Newly Created Connection' check box if you wish to be routed to the new connection's configuration screen after clicking Finish.

6. Click Finish to save the settings.

The new GRE tunnel will be added to the network connections list, and will be configurable like any other connection.

8.4.26.2. General

To view and edit the GRE connection settings, click the 'WAN GRE' link in the 'Network Connections' screen (see figure Figure 8.10). The 'WAN GRE Properties' screen will appear (see figure Figure 8.309), displaying a detailed summary of the connection's parameters, under the 'General' tab. These parameters can be edited in the rest of the screen's tabs, as described in the following sections.

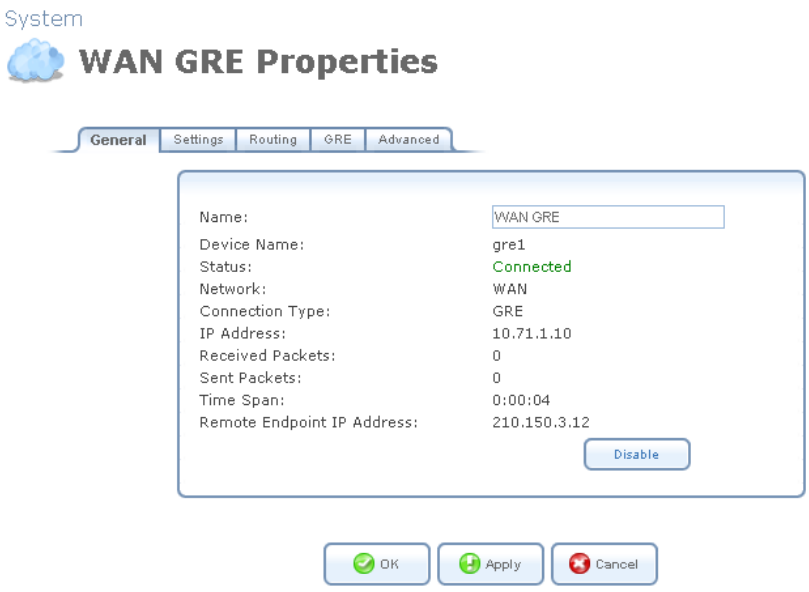


Figure 8.309. WAN GRE Properties

8.4.26.3. Settings

General This section displays the connection's general parameters.

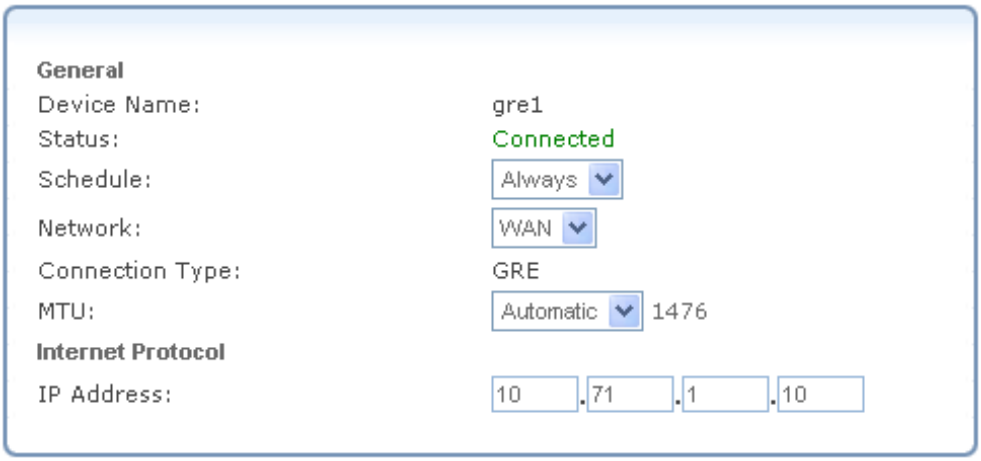


Figure 8.310. General WAN GRE Settings

Schedule By default, the connection will always be active. However, you can configure scheduler rules in order to define time segments during which the connection may be active. Once a scheduler rule(s) is defined, the combo box will allow you to choose between the available rules. To learn how to configure scheduler rules, refer to Section 8.9.3.

Network Select whether the parameters you are configuring relate to a WAN, LAN or DMZ connection, by selecting the connection type from the combo-box. For more information, refer to Section 8.4.2.

MTU MTU is the Maximum Transmission Unit. It specifies the largest packet size permitted for Internet transmission. In the default setting, Automatic, the gateway selects the best MTU for your Internet connection. Select 'Automatic by DHCP' to have the DHCP determine the MTU. In case you select 'Manual' it is recommended to enter a value in the 1200 to 1500 range.

Internet Protocol The local IP address for the interface.

8.4.26.4. Routing

You can choose to setup your gateway to use static or dynamic routing. Dynamic routing automatically adjusts how packets travel on the network, whereas static routing specifies a fixed routing path to neighboring destinations.

Routing Mode Select one of the following routing modes:

Route Use route mode if you want your gateway to function as a router between two networks.

NAPT Network Address and Port Translation (NAPT) refers to network address translation involving the mapping of port numbers, allowing multiple machines to share a single IP address. Use NAPT if your LAN encompasses multiple devices, a topology that necessitates port translation in addition to address translation.

Device Metric The device metric is a value used by the gateway to determine whether one route is superior to another, considering parameters such as bandwidth, delay, and more.

Default Route Select this check box to define this device as a the default route.

Routing Information Protocol (RIP) Select this check box to enable the Routing Information Protocol (RIP). RIP determines a route based on the smallest hop count between source and destination. When RIP is enabled, select the following:

- Listen to RIP messages - select 'None', 'RIPv1', 'RIPv2' or 'RIPv1/2'.

- Send RIP messages - select 'None', 'RIPv1', 'RIPv2-broadcast' or 'RIPv2-multicast'.

Multicast - IGMP Proxy Internal IGMP proxy enables the system to issue IGMP host messages on behalf of hosts that the system discovered through standard IGMP interfaces. IGMP proxy enables the routing of multicast packets according to the IGMP requests of LAN devices asking to join multicast groups. Select the 'Multicast IGMP Proxy Internal' check-box to enable this feature.

IGMP Query Version OpenRG supports all three versions of IGMP. Select the version you would like to use.

Routing Table Allows you to add or modify routes when this device is active. Use the 'New Route' button to add a route or edit existing routes.

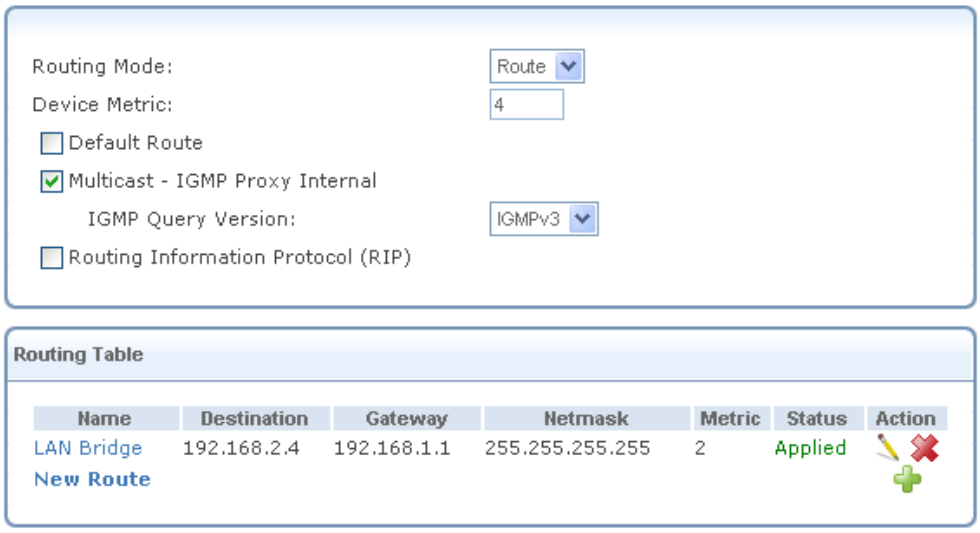


Figure 8.311. Advanced Routing Properties

To learn more about this feature, please refer to chapter Section 8.6.1 .

8.4.26.5. GRE

The tunnel's remote endpoint IP address.

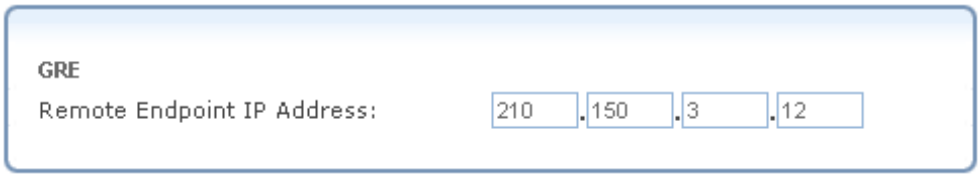


Figure 8.312. GRE

8.4.26.6. Advanced

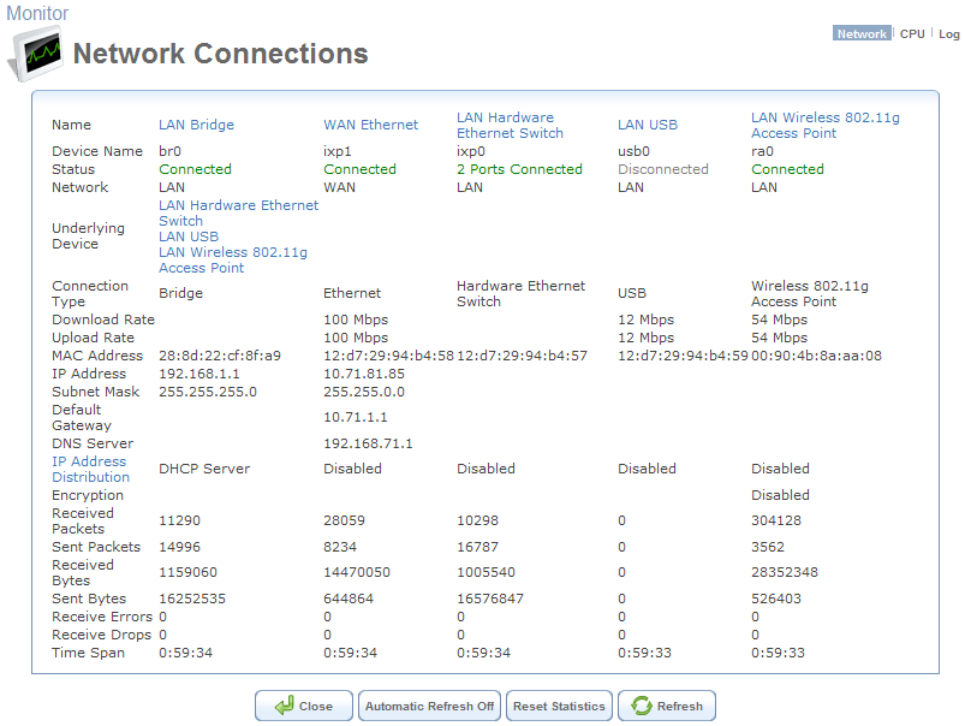
- **Internet Connection Firewall** Your gateway's firewall helps protect your computer by preventing unauthorized users from gaining access to it through a network such as the Internet. The firewall can be activated per network connection. To enable the firewall on this network connection, select the 'Enabled' check box. To learn more about your gateway's security features, refer to Section 7.3.

Figure 8.313. Internet Connection Firewall

8.5. Monitor

8.5.1. Network

The 'Monitoring' screen (see figure Figure 8.314) displays a table summarizing the monitored connection data. OpenRG constantly monitors traffic within the local network and between the local network and the Internet. You can view statistical information about data received from and transmitted to the Internet (WAN) and to computers in the local network (LAN).



Name	LAN Bridge	WAN Ethernet	LAN Hardware Ethernet Switch	LAN USB	LAN Wireless 802.11g Access Point
Device Name	br0	ixp1	ixp0	usb0	ra0
Status	Connected	Connected	2 Ports Connected	Disconnected	Connected
Network	LAN	WAN	LAN	LAN	LAN
Underlying Device	LAN Hardware Ethernet Switch LAN USB LAN Wireless 802.11g Access Point				
Connection Type	Bridge	Ethernet	Hardware Ethernet Switch	USB	Wireless 802.11g Access Point
Download Rate		100 Mbps		12 Mbps	54 Mbps
Upload Rate		100 Mbps		12 Mbps	54 Mbps
MAC Address	28:8d:22:cf:8f:a9	12:d7:29:94:b4:58	12:d7:29:94:b4:57	12:d7:29:94:b4:59	00:90:4b:8a:aa:08
IP Address	192.168.1.1	10.71.81.85			
Subnet Mask	255.255.255.0	255.255.0.0			
Default Gateway		10.71.1.1			
DNS Server		192.168.71.1			
IP Address Distribution	DHCP Server	Disabled	Disabled	Disabled	Disabled
Encryption					Disabled
Received Packets	11290	28059	10298	0	304128
Sent Packets	14996	8234	16787	0	3562
Received Bytes	1159060	14470050	1005540	0	28352348
Sent Bytes	16252535	644864	16576847	0	526403
Receive Errors	0	0	0	0	0
Receive Drops	0	0	0	0	0
Time Span	0:59:34	0:59:34	0:59:34	0:59:33	0:59:33

Figure 8.314. Monitoring Connections

Click the 'Refresh' button to update the display, or press the 'Automatic Refresh On' button to constantly update the displayed parameters.

8.5.2. CPU

The 'CPU' screen (see figure Figure 8.315) displays the amount of time that has passed since the system was last started, and the load average. The load average provides information on the CPU load, by specifying the number of processes that have been in "running" state in average, for the last 1, 5, and 15 minutes.

In addition, this screen displays a list of all the processes currently running on OpenRG and their virtual memory usage. The screen is automatically refreshed by default, though you may change this by clicking 'Automatic Refresh Off'.

Monitor
CPU
Network | CPU | Log
System Has Been Up For: 7 hours, 31 minutes
Load Average (1 / 5 / 15 mins.): 4.17 / 4.06 / 4.01
Processes
Process | Total Virtual Memory (VmData) | Heap size (VmSize)
init 2108 kB 256 kB
openrg 8664 kB 2532 kB
l2tpd 448 kB 108 kB
pluto 1120 kB 236 kB
sshd 2540 kB 408 kB
asterisk 3396 kB 988 kB
asterisk 3396 kB 988 kB
asterisk 3396 kB 988 kB
asterisk 3396 kB 988 kB
asterisk 3396 kB 988 kB
asterisk 3396 kB 988 kB
asterisk 3396 kB 988 kB
smbd 3384 kB 768 kB
smbd 3380 kB 768 kB
nmbd 1556 kB 608 kB
_pluto_adns 608 kB 132 kB
asterisk 3396 kB 988 kB
asterisk 3396 kB 988 kB
asterisk 3396 kB 988 kB
Close
Automatic Refresh Off
Refresh

Figure 8.315. CPU Monitoring

8.5.3. Log

The 'Log' screen (see figure Figure 8.316) displays a list of recent activities that have taken place on OpenRG.

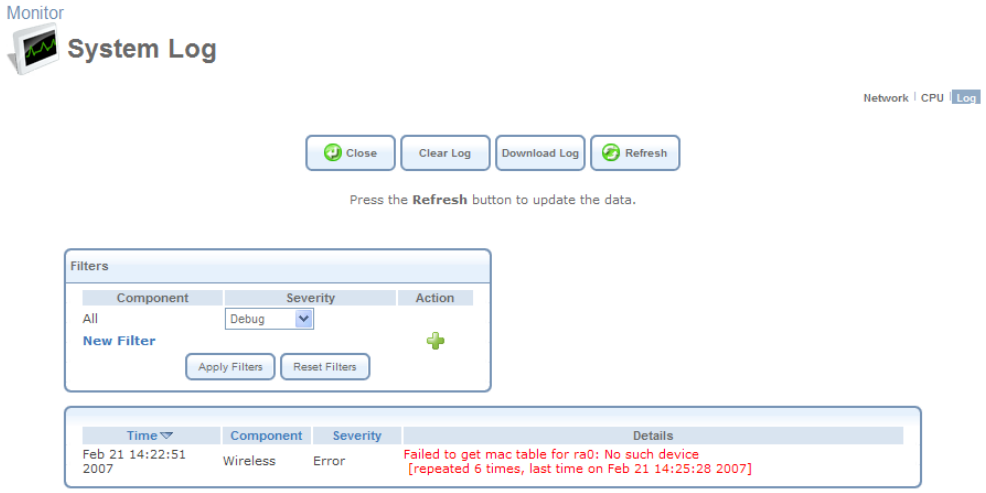

Monitor
System Log
Network | CPU | Log
Close
Clear Log
Download Log
Refresh
Press the Refresh button to update the data.
Filters
Component | Severity | Action
All
Debug
New Filter
Apply Filters
Reset Filters
Time | Component | Severity | Details
Feb 21 14:22:51 2007 Wireless Error Failed to get mac table for ra0: No such device [repeated 6 times, last time on Feb 21 14:25:28 2007]

Figure 8.316. System Log

Use the four buttons at the top of the page to:

Close Close the 'Log' screen and return to OpenRG's home page.

Clear Log Clear all currently displayed log messages.

Download Log Download all currently displayed log messages to a "system.log" file.

Refresh Refresh the screen to display the latest updated log messages.

By default, all log messages are displayed one after another, sorted by their order of posting by the system (newest on top). You can sort the messages according to the column titles---Time, Component, or Severity. This screen also enables you to filter the log messages by the component that generated them, or by their severity, providing a more refined list. This ability is useful mainly for software developers debugging OpenRG. By default, the screen displays log messages with 'debug' severity level and higher, for all components (see default filter in figure Figure 8.316). You may change the severity level for this filter. To add a new filter, click the 'New Filter' link or its corresponding action icon . The screen refreshes.

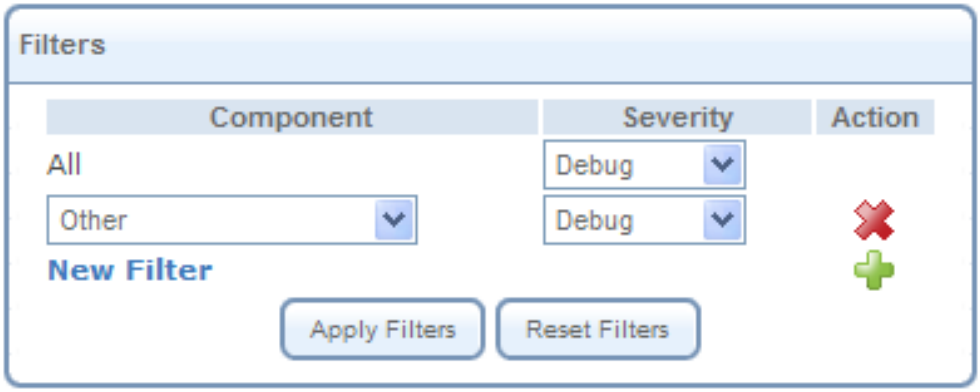


Figure 8.317. System Log Filters

Using the drop-down lists, select the component and severity level by which to sort the log messages. Click 'Apply Filters' to display the messages in your specified criteria. You can add more filters in the same way, or delete filters using their respective action icon s. Defined filters override the default filter that displays all messages.

Note: Clicking "Reset Filters" deletes all the defined filters without a warning.

8.6. Routing

8.6.1. Overview

Access OpenRG's routing settings by clicking the 'Routing' tab under the 'System' screen, or by clicking the 'Routing' icon in the 'Advanced' screen. The basic 'Routing' screen appears. Press the 'Advanced' button to view the full routing settings (see figure Figure 8.318).

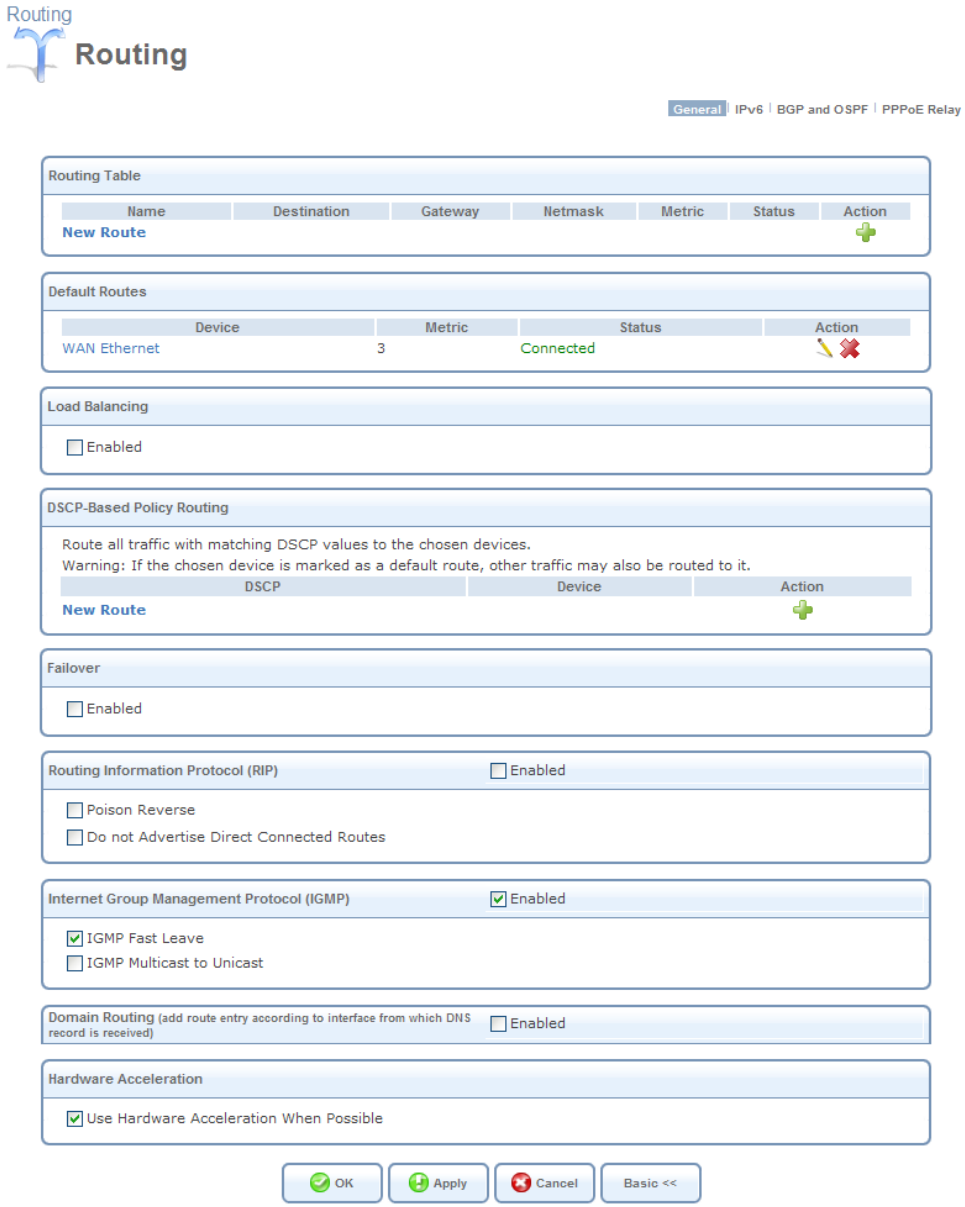


Figure 8.318. Routing

8.6.1.1. Routing Table

You can add, edit and delete routing rules from the routing table in the manner described in section Section 3.5 . Click the 'New Route' link. The 'Route Settings' screen appears:

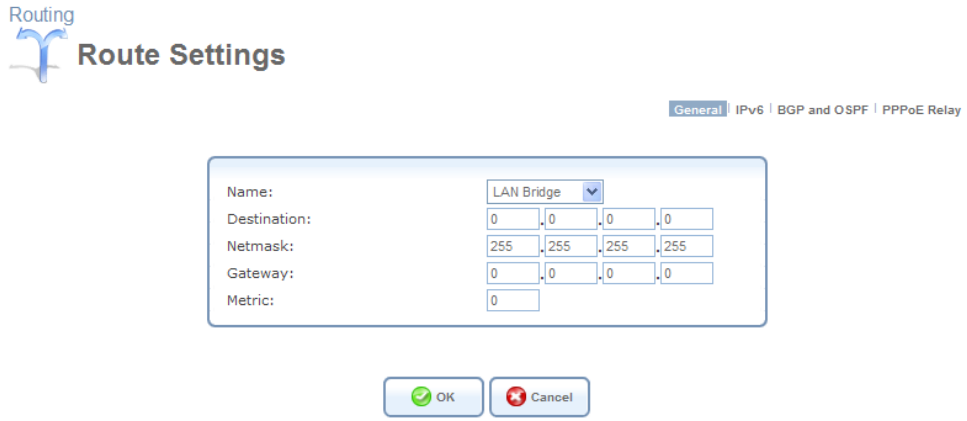


Figure 8.319. Route Settings

When adding a routing rule, you need to specify the following:

Name Select the network device.

Destination The destination is the destination host, subnet address, network address, or default route. The destination for a default route is 0.0.0.0.

Netmask The network mask is used in conjunction with the destination to determine when a route is used.

Gateway Enter the gateway's IP address.

Metric A measurement of the preference of a route. Typically, the lowest metric is the most preferred route. If multiple routes have the same metric value, the default route will be the first in order of appearance.

8.6.1.2. Default Routes

OpenRG's default route devices are displayed in the 'Default Routes' section of the 'Routing' screen. You can change the route preference by clicking an entry's action icon and changing the metric value. If you wish to add an additional (logical) default route device, you must first define a new WAN device that has an IP address. For example:

1. Define a new PPTP VPN connection over your WAN (to learn how to do so, please refer to section Section 8.4.12.2). The 'New Default Route' link now appears in the 'Default Routes' section of the 'Routing' screen (see figure Figure 8.320).

Figure 8.320. Default Routes

2. Click the 'New Default Route' link in the 'Default Routes' section. The 'Default Route Settings' screen appears, displaying the new WAN device (see figure Figure 8.321).

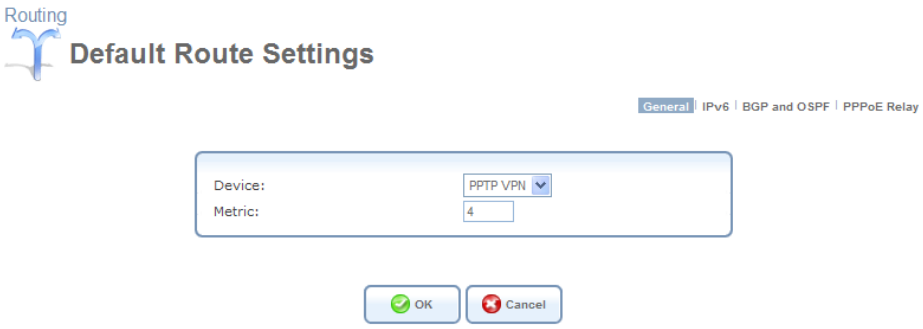


Figure 8.321. Default Route Settings

3. Enter a value for the metric route preference.

4. Click 'OK' to save the settings.

Although multiple devices may be configured as default routes, only one will serve as the default route -- the one with the lowest metric value, or, if metric values are identical, the first in order. Defining a single default route is especially important in conjunction with the DSCP-based policy routing (please refer to section Section 8.6.1.3.2).

8.6.1.3. Multiple WAN Devices

OpenRG supports platforms with multiple physical WAN devices (ports), which can be used for traffic load balancing, failover, and various routing policies. The multiple WAN features may also be used to define multiple logical devices (e.g. PPTP VPN, PPPoE) on boards with a single WAN port.

- **Load balancing** means that you may choose to balance the traffic load between the two WAN devices (see section Section 8.6.1.3.1).
- **DSCP-based policy routing** means that you may specify that all traffic matching a certain DSCP value will be routed to a chosen device (refer to section Section 8.6.1.3.2).
- **Failover** means that traffic will be routed to an active WAN device in case its current WAN device fails, ensuring connectivity (see section Section 8.6.1.3.3).

Note: DSCP-based policy routing takes precedence over load balancing. In addition, if WAN failover occurs, it will take place on the remaining non-DSCP directed traffic only.

8.6.1.3.1. Load Balancing

Load balancing provides the ability to use the bandwidth of two parallel WAN circuits for distributing traffic. Load balancing uses the IP pairs technique, in which traffic between a pair of source and destination IP addresses is routed to the same WAN device for a certain timeframe. A router load balancing on a per-destination basis uses the parallel routes in a round-robin fashion, and forwards an entire destination-based flow in each pass.

Note: Only default route devices (refer to section Section 8.6.1.2) can participate in load balancing.

To enable load balancing between multiple WAN devices, perform the following:

1. Select the 'Enabled' check box in the 'Routing' screen (see figure Figure 8.318). The screen will refresh, displaying the load balancing table (see figure Figure 8.322).

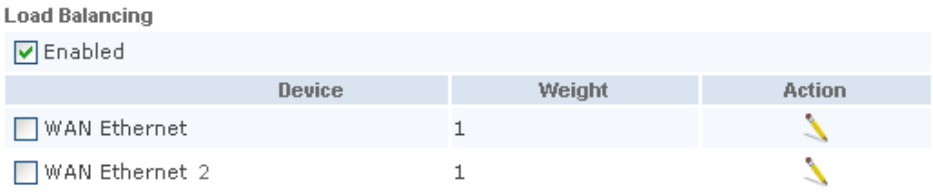


Figure 8.322. Load Balancing

2. Select the devices on which load balancing will be performed by checking their respective check-boxes.
3. You may also control the weight of each device in the balancing procedure, which determines the ratio of IP pairs provided to each device:
    1. Click the action icon of the device. The 'Edit Weight of Device' screen appears:

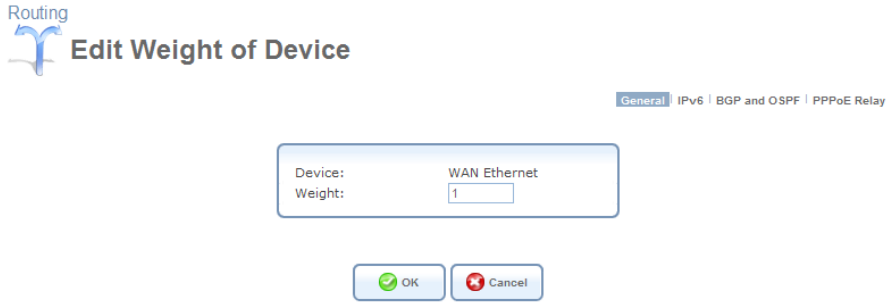


Figure 8.323. Edit Weight of Device

    2. Enter the numeric ratio that will represent the weight of the device.
    3. Click 'OK' to save the settings.
4. Click 'OK' to save the settings.

8.6.1.3.2. DSCP-Based Policy Routing

DSCP-based policy routing provides the ability to send specific traffic out of a specific WAN interface. This is useful in order to route different types of data to different WAN devices. It is also useful if you want to segregate the voice traffic from the data traffic over two lower-cost broadband circuits in an effort to have better voice quality. To add a DSCP-based policy route, perform the following:

1. Click the 'New Route' link. The 'Add a DSCP-Based Route to a Device' screen appears:

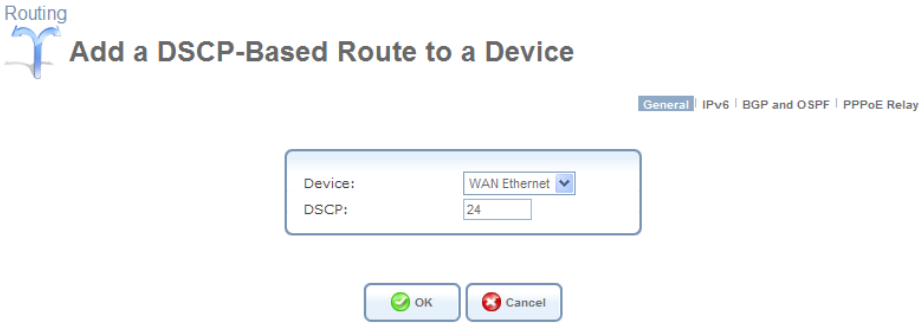


Figure 8.324. Adding a DSCP-Based Route to a Device

2. Select the network device from the drop-down menu.

3. Specify the DSCP value. All traffic matching this DSCP value will be routed to the chosen device.

4. Click 'OK' to save the settings.

You can mark certain traffic with DSCP values of your choice, as explained in the DSCP Remark section of the VLAN interface properties (see section Section 8.4.23.5). The DSCP-based policy routing ensures that specified traffic is routed via a certain WAN device, but if this WAN device is defined as the default route, other traffic may also be routed through it. If you want your device to be dedicated to transmitting only traffic matching the DSCP value you specified, you must uncheck the default route check-box for that device. DSCP-based policy routing takes precedence over load balancing, so if most of the traffic falls under the DSCP-based policy routing rules, it will be forwarded accordingly, regardless of the load balancing. Load balancing, in this case, will be a best-effort load balancing, and will balance the remaining traffic not directed by the DSCP-based policy routing rules.

8.6.1.3.3. Failover

Failover is the transfer of operation from a failed component to a similar, redundant component to ensure uninterrupted data flow and operability. OpenRG supports WAN failover on multiple WAN platforms. WAN failover will take place when a WAN device fails, regardless of whether load balancing and/or DSCP-based policy routing rules are enabled. This means that if the WAN Ethernet 1 device fails, all traffic that was meant to be routed through it, will now be routed through WAN Ethernet 2. Even if the traffic is defined to be routed via WAN Ethernet 1 according to DSCP-based policy routing rules, it will still failover to WAN Ethernet 2 until WAN Ethernet 1 resumes its connectivity. Similarly, load balancing will not work if one of the WAN devices fails, but will resume working once the failover situation is resolved. OpenRG supports two types of failover:

- **Full Link Redundancy** (also known as Load Balancing Failover) Two or more active WAN devices with equal speed must be configured. One device will be the backup of another -- if the main one fails, the other will take its place. The load balancing feature usually supplies this type of failover.

- **Rollover Connection** During uptime, a rollover device is kept inactive. This is usually a slow link, for example, a dialup. When all other failover devices lose connectivity, the rollover device will become active automatically, and may keep the same IP as the main device. This allows to use a slow connection as a backup to the main fast connection. When a failover device regains connectivity, the rollover device will become inactive again. Note that if dialup is done by demand, activating the backup device may take a noticeable amount of time.

The failover process is consisted of three phases:

1. Detection -- performed using a DNS test.

2. Action -- when a DNS test has failed, the failover process simply removes the route records of the failed connection. This enables you to reach the desired failover behavior by configuring OpenRG's routing rules correctly.

3. Recover -- during failover, tests continue to run on the failed connection. When a test succeeds, the connection will recover its route records.

Failover scenarios:

- **Inbound Failover** A common problem occurs when a connection fails, and its IP is no longer accessible. This is referred to as Inbound Failover, and is resolved by informing the other party to use a different IP, using Dynamic DNS.

- **IPSec** (Also refer to section Section 7.10.1.3) When an IPSec underlying connection looses connectivity or fails connectivity tests, the following scenarios are possible:

    1. In case an IPSec template is available, traffic will be received from all WAN devices.

    2. In case an IPSec connection is defined, and:

1. No underlying connection is configured -- the IPSec connection will disconnect and attempt to reconnect while choosing the underlying connection according to existing route rules.

2. An underlying connection is configured -- the behavior will be similar, with the exception that the chosen underlying connection may only be a failover connection to the configured underlying connection. If you wish to force IPSec to use the configured underlying connection without failover, do not configure the underlying connection as a failover connection.

3. At the recover stage, if:

   1. No underlying connection is configured -- OpenRG assumes that the WAN connection used as the underlying connection is unimportant. Hence, the IPSec connection will not disconnect from its current device.

   2. An underlying connection is configured -- the IPSec connection will always try to go back to its configured underlying device. It will disconnect, and return to the recovered WAN connection.

To enable failover between multiple WAN devices, perform the following:

1. Select the 'Enabled' check box in the 'Routing' screen (see figure Figure 8.318). The screen will refresh, displaying the failover table (see figure Figure 8.325).

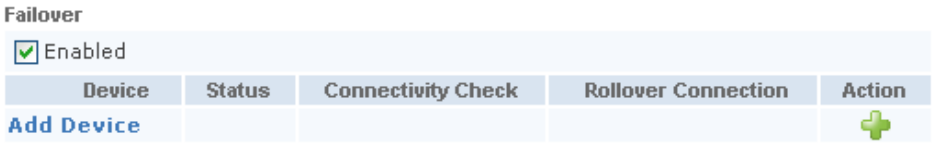


Figure 8.325. Failover

2. Click the 'Add Device' link to add a failover device. The 'Add Failover Device' screen appears:

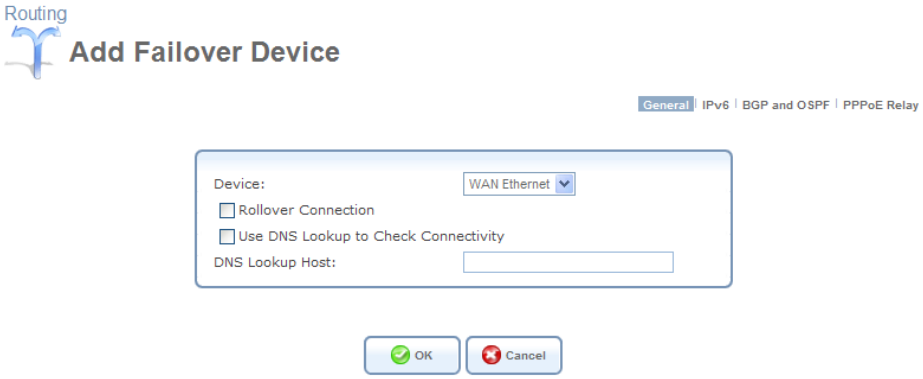


Figure 8.326. Add Failover Device

Device Select the WAN device you would like to configure as failover.

Rollover Connection Select this check-box to configure the WAN device as a rollover connection type of failover.

Use DNS Lookup to Check Connectivity Select this check-box to enable a periodic connectivity check using a DNS query.

DNS Lookup Host If you selected the previous check-box, insert the URL that the periodic check will query.

3. Click 'OK' to save the settings.

In order to clarify the use of failover, the following are failover use-cases that depict actual uses of this feature. These use-cases assume that you are running a multiple WAN platform with at least two WAN devices.

- **Redundancy** In the 'Routing' screen (see figure Figure 8.318), perform the following steps:

1. In the 'Default Routes' section, define WAN Ethernet (WAN 1) as a default route with metric 3.

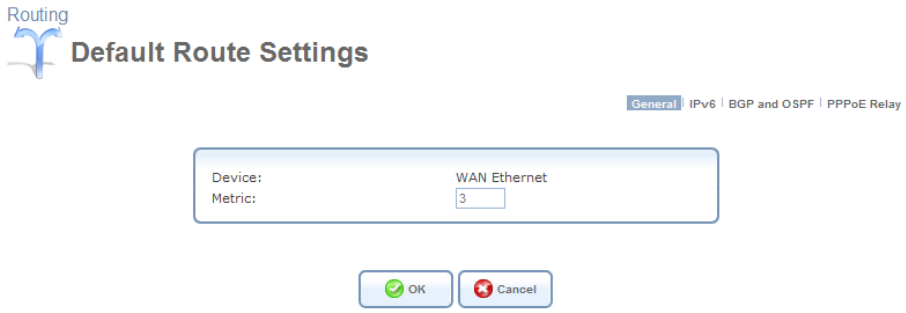


Figure 8.327. WAN 1 Default Route Settings

2. Similarly, define WAN Ethernet 2 (WAN 2) as a default route with metric 5.

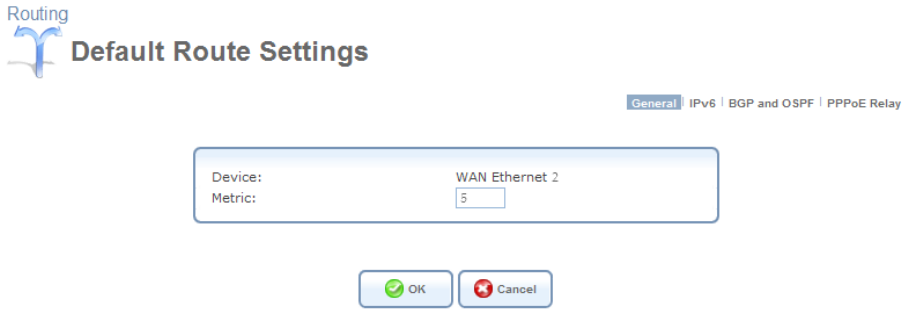


Figure 8.328. WAN 2 Default Route Settings

3. In the 'Routing Table' section, click the 'New Route' link to define a route rule for WAN 2, with destination 192.168.71.0, netmask 255.255.255.0, and gateway 192.168.71.1.

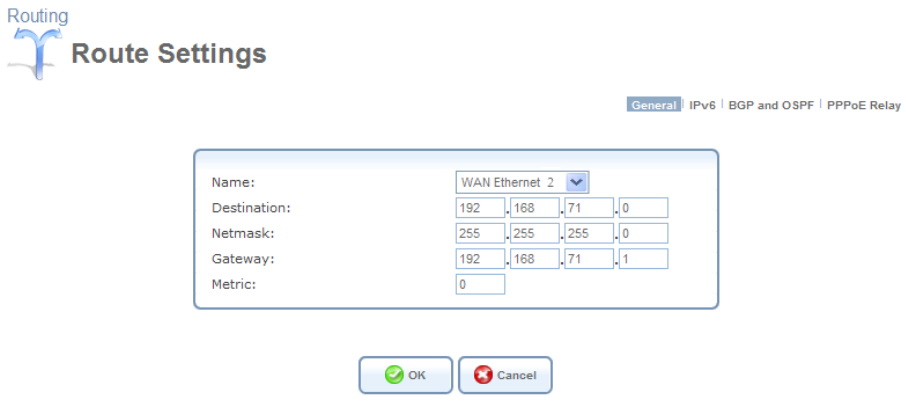


Figure 8.329. WAN 2 Route Rule

4. In the 'Failover' section, add both devices to the failover table, defining them with DNS connectivity checks to http://www.google.com .

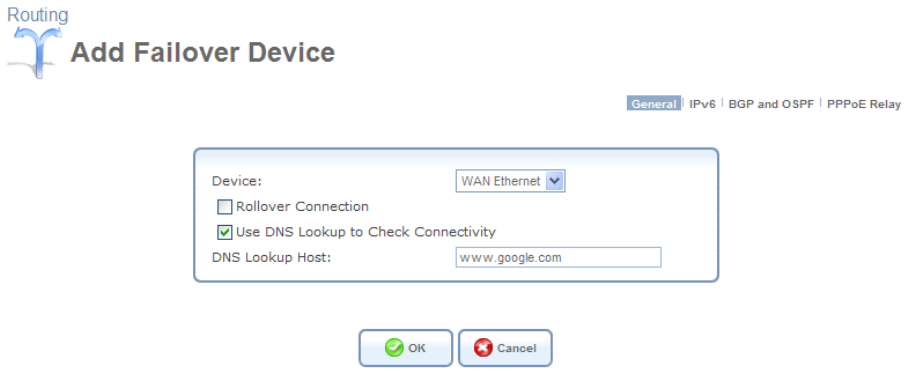


Figure 8.330. Add Failover Device

5. Click 'OK' to save the settings.

When both connections are active, the default route will be WAN 1, while WAN 2 will be used merely for access to destination 192.168.71.0. If WAN 1 fails, its route records will be deleted, and WAN 2 will become the default route, handling all traffic.

- **Full Link Redundancy with Load Balancing** This use-case is similar to the previous, but with load balancing between the default routes.

1. Define all settings according to the previous use-case.

2. In the 'Load Balancing section', select the check-boxes of both WAN 1 and WAN 2.

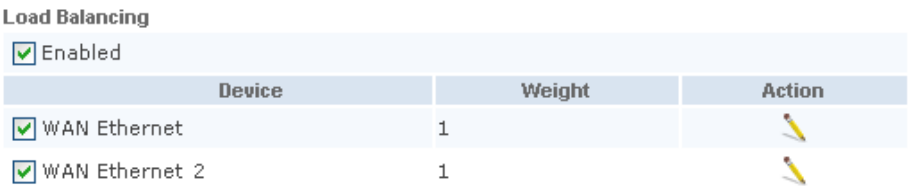


Figure 8.331. Load Balancing

3. Click 'OK' to save the settings.

When both connections are active, both will share the traffic, except for traffic to 192.168.71.0, which will only be redirected to WAN 2. If one of the devices fails, the other will instantly take responsibility over all traffic.

- **Rollover**

1. In the 'Default Routes' section, click the 'New Default Route' link to define WAN 1 as a default route with metric 3.

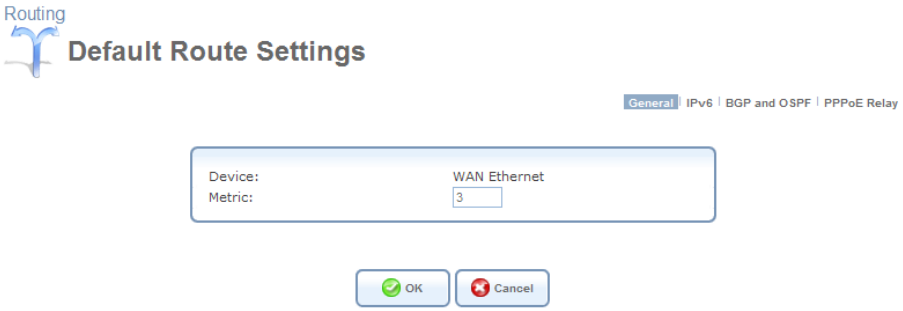


Figure 8.332. WAN 1 Default Route Settings

2. Similarly, define WAN 2 as a default route with metric 3.

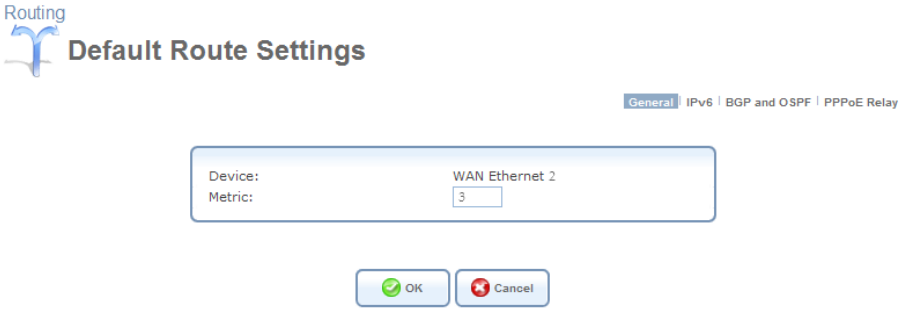


Figure 8.333. WAN 2 Default Route Settings

3. In the 'Routing Table' section, click the 'New Route' link to define a route rule for WAN 1, with destination 192.168.71.0, netmask 255.255.255.0, and gateway 192.168.71.1.

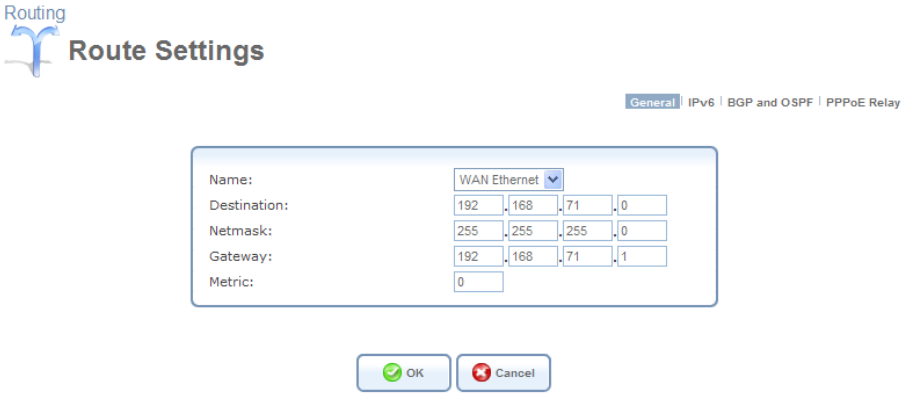

Routing
Route Settings
General | IPv6 | BGP and OSPF | PPPoE Relay
Name: WAN Ethernet
Destination: 192 . 168 . 71 . 0
Netmask: 255 . 255 . 255 . 0
Gateway: 192 . 168 . 71 . 1
Metric: 0
OK
Cancel

Figure 8.334. WAN 1 Route Rule

4. In the 'Failover' section, add WAN 1 to the failover table, defining it with a DNS connectivity check to http://www.google.com .

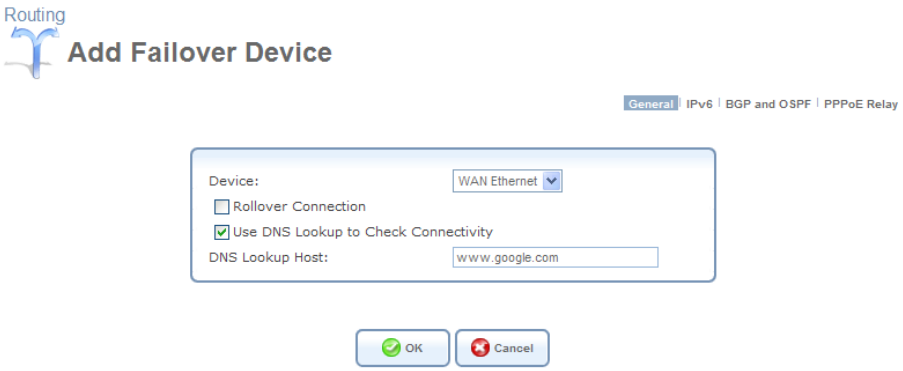


Figure 8.335. WAN 1 Failover Settings

5. Similarly, add WAN 2, defining it as a rollover connection.

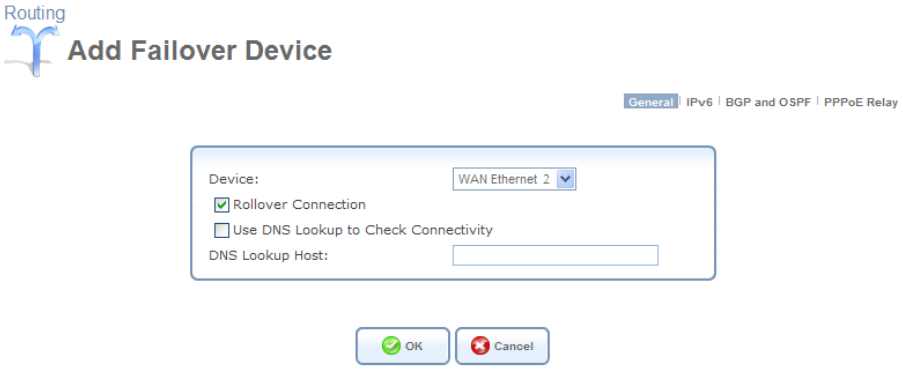


Figure 8.336. WAN 2 Failover Settings

6. Click 'OK' to save the settings.

Regularly, only WAN 1 will be active, handling all traffic, while WAN 2 is dormant. If WAN 1 fails, WAN 2 will become active. In case WAN 2 is a dialup device, it will start a dialup session with the ISP. After establishing a connection, it will become the default route, since its default route record is the only one remaining active. Should WAN 1 become active again, WAN 2 will recognize that it is no longer needed, and will shut down.

8.6.1.4. Routing Protocols

Routing Information Protocol (RIP) Select this check-box in order to enable connections previously defined to use RIP. If this check-box is not selected, RIP will be disabled for all connections, including those defined to use RIP.

Poison Reverse OpenRG will advertise acquired route information with a high metric, in order for other routers to disregard it.

Do not Advertise Direct Connected Routes OpenRG will not advertise the route information to the same subnet device from which it was obtained.

Internet Group Management Protocol (IGMP) OpenRG provides support for IGMP multicasting.
When a host sends out a request to join a multicast group, OpenRG will listen and intercept the group's traffic, forwarding it to the subscribed host. OpenRG keeps record of subscribed hosts. When a host requests to cancel its subscription, OpenRG queries for other subscribers and stops forwarding the multicast group's traffic after a short timeout.

Enable IGMP Fast Leave If a host is the only subscriber, OpenRG will stop forwarding traffic to it immediately upon request (there will be no query delay).

Domain Routing When OpenRG's DNS server receives a reply from an external DNS server, it will add a routing entry for the IP address of the reply through the device from which it arrived. This means that future packets from this IP address will be routed through the device from which the reply arrived.

8.6.1.5. Hardware Acceleration

The Hardware Acceleration feature utilizes the **Fastpath** algorithm, which enhances packet flow, resulting in faster communication between the LAN and the WAN (excluding the wireless connection). By default, this feature is enabled.

8.6.2. IPv6

At the current stage of the IP network technology, an IPv4 WAN has no inherent support of Internet Protocol version 6 (IPv6). As a result, two IPv6 hosts cannot communicate with each other directly, if they are located at two separate IPv6 LANs interconnected by an IPv4 WAN (either the global Internet or a corporate WAN). The easiest way to solve this problem is to establish a special network mechanism, called *IPv6-over-IPv4 Tunneling*. This mechanism encapsulates IPv6 packets into IPv4 packets, in order to transmit them via IPv4 WAN to the target IPv6 host. OpenRG successfully implements the IPv6 technology.
The following scenario demonstrates how to establish communication between two IPv6 hosts via OpenRG. Each host belongs to a separate IPv6 network. The two networks are interconnected by an IPv4 WAN. For convenience, let's call the two machines Host **A** and Host **B** . In the same fashion, let's call the two gateways, connected to the host machines, OpenRG **A** and OpenRG **B** respectively. The following diagram outlines this scenario.

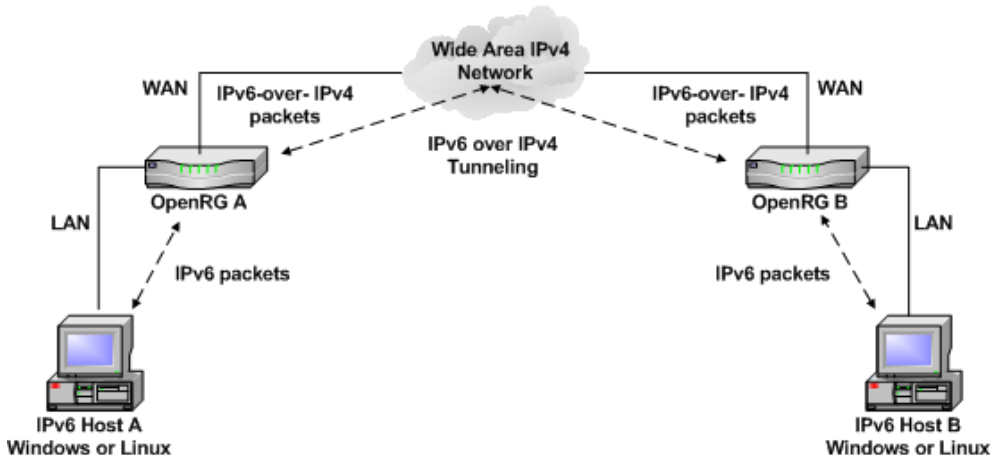


Figure 8.337. IPv6-over-IPv4 Tunneling via OpenRG

There are several variations of the IPv6 network setup, depending on the operating system installed on the host machines. OpenRG's IPv6 feature enables you to establish an IPv6 network between:

- Linux hosts
- Windows hosts
- Linux and Windows hosts

Note: The following instructions should be followed at both ends of the IPv6- over-IPv4 tunnel, otherwise the packets will travel only in a single direction.

After connecting an IPv6 host to OpenRG at both locations, perform the following:

1. Configure the gateway to support the IPv6-over-IPv4 tunneling.
2. Configure the IPv6 host according to the parameters defined in its gateway.

The following sections describe each of these steps.

8.6.2.1. Setting up the IPv6-over-IPv4 Tunneling in OpenRG

This setup procedure consists of the following steps:

- Enabling the IPv6 feature
- Adding a new LAN subnet to the LAN bridge and configuring its settings
- Configuring the IPv6-over-IPv4 tunnel settings

1. Verify that the IPv6 feature is enabled in each of the gateways, by performing the following:
    1. Click the 'IPv6' icon in the 'Advanced' screen of the WBM. If the feature is disabled, the following screen appears.

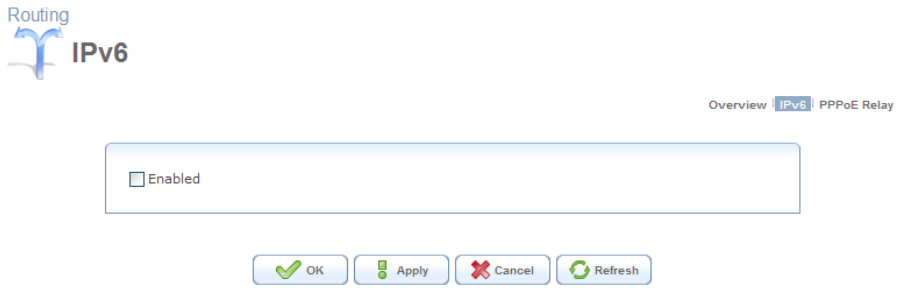


Figure 8.338. Disabled IPv6

    2. Select the 'Enabled' check box. The screen refreshes, changing to the following.

Figure 8.339. Enabled IPv6

    3. Click 'Apply' to save the settings.
2. Add a new LAN subnet to the LAN bridge by performing the following:
    1. In the WBM, click the 'System' tab, and then click the 'Network Connections' link. The 'Network Connections' screen appears.

Figure 8.340. Network Connections

2. Click the 'LAN Bridge' link. The 'LAN Bridge Properties' screen appears.

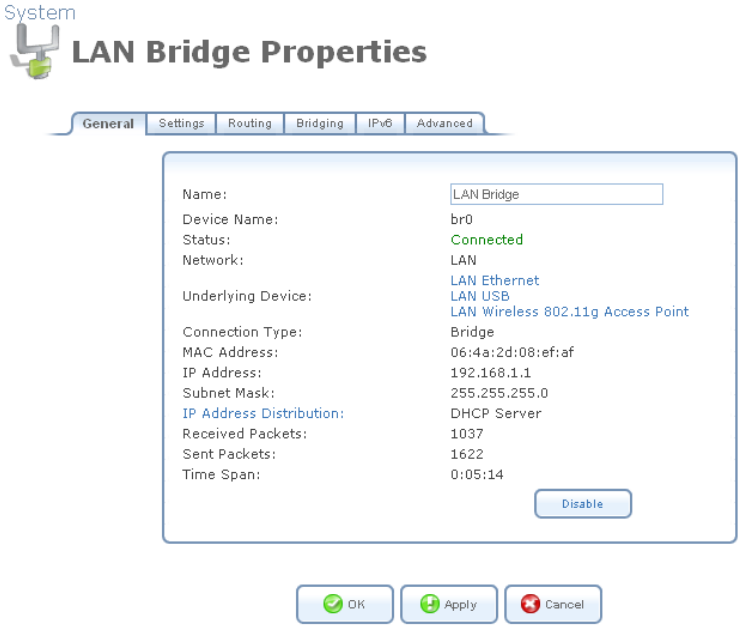


Figure 8.341. LAN Bridge Properties

3. Click the 'IPv6' link. The IPv6 settings screen appears.

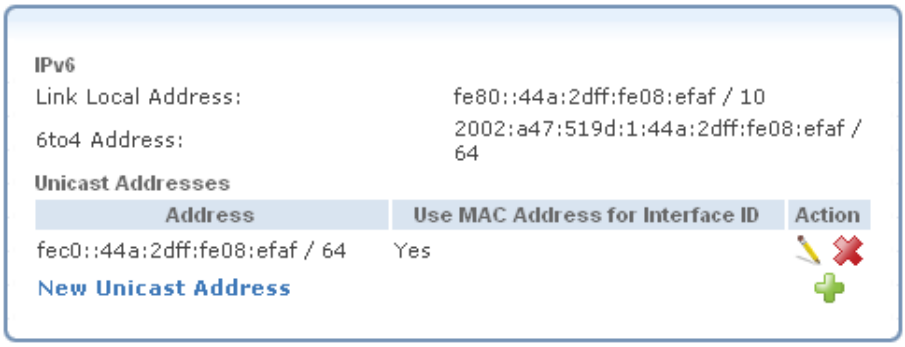


Figure 8.342. IPv6 Settings

4. Click the 'New Unicast Address' link. Alternatively, click its action icon . The 'IPv6 Unicast Address' screen appears.

Figure 8.343. IPv6 Unicast Address Parameters

5. In the 'IPv6 Address/Prefix Length' field, enter the IPv6 address of the new LAN subnet and its prefix length. For example, assign the following IPv6 address to the LAN subnet of OpenRG **A** : `fec0::100:aaaa:bbbb:cccc:dddd/64` . The `fec0` part shows that this is a *Site-Local* address (an IPv6 address within a LAN). The `100` part is the ID number of the subnet. The next four parts (represented with letters) are unrestricted, unless they are generated from the gateway's MAC address. The `64` part is the prefix length.

   Note: The 'IPv6 Unicast Address' screen contains the 'Use MAC Address for Interface ID' option. If it is enabled, OpenRG generates the lower 64 bits of the IPv6 address from its MAC address.

6. Click 'OK' to save the setting, and to return to the 'LAN Bridge Properties' screen.

7. Verify that the new subnet has received the unicast address.

In the same way as described above, define a new subnet in OpenRG **B** . For example, assign the following IPv6 address to this subnet: `fec0::200:aaaa:bbbb:cccc:dddd/64` .

3. Configure the IPv6-over-IPv4 tunnel in **each of the gateways** . For example, to configure the tunnel in OpenRG **A** , perform the following:

   1. In the 'IPv6' settings screen (see figure Figure 8.339), click the 'New Route' link to specify the IPv6-over-IPv4 tunnel parameters. The 'Set IPv6 Tunnel' screen appears.

Figure 8.344. IPv6 Tunnel Parameters

   2. In the 'IPv6 Destination Address/Prefix Length' field, specify the IPv6 address of the OpenRG **B** LAN subnet.

   3. In the 'Tunnel Peer IP Address' fields, enter the WAN IP of OpenRG **B** .

   4. Click 'OK' to save the settings.

Basing on the same principle, configure OpenRG **B** .

8.6.2.2. Setting up the IPv6 Network Connection on a Linux Host

This setup procedure consists of three steps:

- Adding IPv6 support, if not yet enabled
- Adding the new LAN subnet defined in OpenRG
- Creating an IPv6 routing rule

1. Verify that the Linux host supports IPv6, by performing the following:
    1. Open a shell and switch to the root user, by entering the `su` command.
    2. Enter the following command: `lsmod | grep ipv6` . If the command returns no result, it means that IPv6 support is disabled. To enable IPv6 support, enter the following command as the root user: `insmod ipv6` .
2. Add the IPv6 address defined in the new LAN subnet to the host's network settings. For example, assign the IPv6 address of the OpenRG **A** LAN subnet to the Host **A** network device. To perform this, run the following command as the root user: `ip -6 addr add fec0::100:1111:2222:3333:4444/64 dev <Host A LAN connection label>` .

    Note: To check the network connection label in Linux, go to its shell and run the `ifconfig` command.

    If Host **B** runs Linux too, follow the procedure described above. In this case, however, you must specify the IPv6 address defined in the OpenRG **B** LAN subnet, and enter the network connection label of the Host **B** machine.
3. Add a routing rule directing the host's outgoing IPv6 packets to OpenRG, which will route them to the destination. For example, to add this routing rule to the network settings of Host **A** , run the following command as the root user: `ip -6 route add fec0::200:1111:2222:3333:4444/64 via fec0::100:aaaa:bbbb:cccc:dddd dev <Host A LAN connection label>` . If Host **B** runs Linux too, go to its shell and run the following command as the root user: `ip -6 route add fec0:0:0:100:1111:2222:3333:4444/64 via fec0::200:aaaa:bbbb:cccc:dddd dev <Host B LAN connection label>`

To test the connection, ping through the IPv6-over-IPv4 tunnel.

- In Linux Host **A** run: `ping6 -I <LAN connection label> fec0::200:1111:2222:3333:4444`
- In Linux Host **B** run: `ping6 -I <LAN connection label> fec0::100:1111:2222:3333:4444`

The following are additional commands for testing the IPv6 connection:

- To show the IPv6 routing table, enter: `ip -6 route`
- To show the network device's IPv6 address, enter: `ip -6 addr`

If the second host runs Windows, refer to section Section 8.6.2.3 for explanations about configuring a Windows host.

8.6.2.3. Setting up the IPv6 Network Connection on a Windows Host

This setup procedure consists of three steps:

- Adding IPv6 support, if not yet enabled
- Adding the new LAN subnet defined in OpenRG
- Creating an IPv6 routing rule

Note: The following description is based on the GUI of Windows XP. For information about installing IPv6 on other Windows versions, visit the Microsoft Web site.

1. Verify that the host running Windows supports IPv6, by performing the following:
    1. In 'Control Panel', double-click the 'Network Connections' icon. The 'Network Connections' window appears.
    2. In the 'Network Connections' window, right-click the network connection label (the default label is 'Local Area Connection') and select 'Properties'. The following window appears.

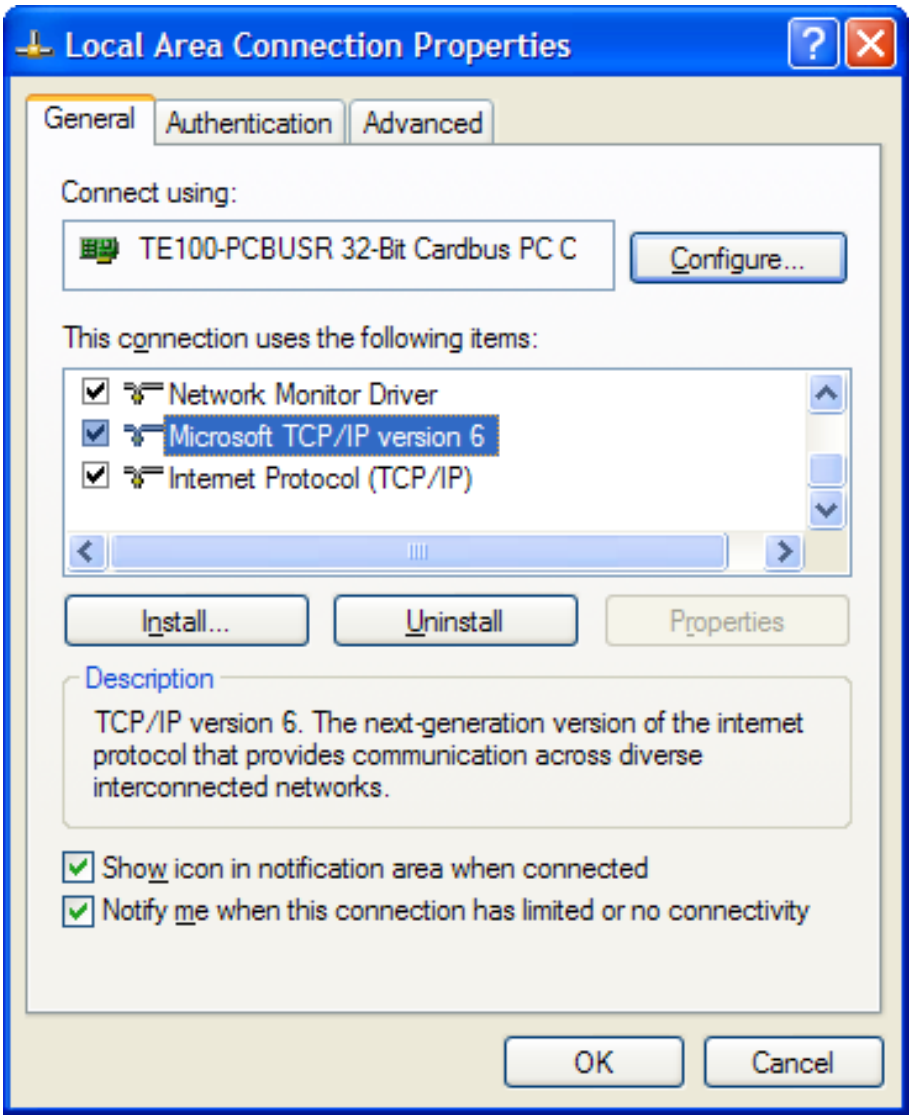


Figure 8.345. Network Connection Properties

3. Ensure that the 'General' tab is selected, and check if the list of connection options contains the following item: 'Microsoft TCP/IP version 6'. If the list contains this item (IPv6 is installed), verify that its check box is selected and proceed to the next step. Otherwise, install IPv6:

    1. In the 'Start' menu, select 'Run'. The 'Run' window appears.

    2. In the 'Open' field, enter `cmd` and click 'OK'. The command prompt window appears.

    3. In the command prompt window, enter the following command: `ipv6 install`. The command initiates the Microsoft TCP/IP version 6 installation. This is an automatic process.

2. Add the IPv6 address of the new LAN subnet to the host's network settings. For example, assign the IPv6 address of the OpenRG **A** LAN subnet to the Host **A** network device, by performing the following:

    1. In the command prompt window, run the following command: `netsh`**Netsh** is a command-line scripting utility that enables you to modify your computer network configuration.

    2. In the `netsh` context, run the following command: `interface ipv6`

    3. In the `interface ipv6` context, run the following command: `add "<Host A LAN connection label>" fec0::100:1111:2222:3333:4444`

    Note: The default LAN connection label in Windows is 'Local Area Connection'.

    4. Enter the following command: `add route fec0::100:aaaa:bbbb:cccc:dddd/64 "<Host A LAN connection label>"`

    If Host **B** runs Windows too, follow the procedure described above, with the only difference that you must specify the IPv6 address of the OpenRG **B** LAN subnet.

3. Add a routing rule directing the host's outgoing IPv6 packets to OpenRG, which will route them to the destination. For example, to add this routing rule to the network settings of Host **A** , perform the following:

    1. In the 'interface ipv6' context, run the following command: `add route fec0::200:1111:2222:3333:4444/64 interface=<Host A LAN connection label> nexthop=fec0::100:aaaa:bbbb:cccc:dddd`

    If Host **B** runs Windows too, perform the following:

    1. In the 'interface ipv6' context, run the following command: `add route fec0::100:1111:2222:3333:4444/64 interface=<Host B LAN connection label> nexthop=fec0::200:aaaa:bbbb:cccc:dddd`

Enter the following command to ping through the IPv6-over-IPv4 tunnel: `ping6 fec0::200:1111:2222:3333:4444/64` If the second host runs Linux, refer to section Section 8.6.2.2 for explanations about configuring a Linux host.

8.6.3. BGP and OSPF

The 'BGP and OSPF' feature is an implementation of two routing protocols used to deliver up-to-date routing information to a network or a group of networks, called *Autonomous System*.

Border Gateway Protocol (BGP) The main routing protocol of the Internet. It is used to distribute routing information among Autonomous Systems (for more information, refer to the protocol's RFC at http://www.ietf.org/rfc/rfc1771.txt).

Open Shortest Path First Protocol (OSPF) An Interior Gateway Protocol (IGP) used to distribute routing information within a single Autonomous System (for more information, refer to the protocol's RFC at http://www.ietf.org/rfc/rfc2328.txt).
The feature's routing engine is based on the *Quagga* GNU routing software package. By using the BGP and OSPF protocols, this routing engine enables OpenRG to exchange routing information with other routers within and outside an Autonomous System. To enable this feature, perform the following:

1. In the 'Routing' screen, click the 'BGP and OSPF' link. The 'BGP and OSPF' screen appears.

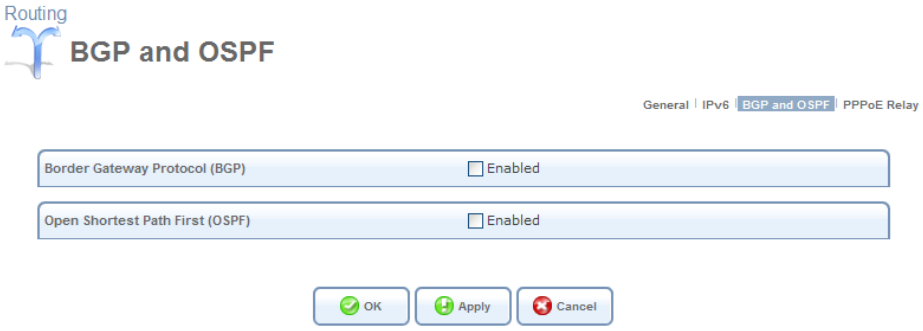


Figure 8.346. BGP and OSPF

Note: Depending on its purpose of use, OpenRG may support both of the protocols or only one of them.

2. Select the 'Enabled' check box of the supported protocol(s). For example, enable OSPF. The screen refreshes, changing to the following.

Figure 8.347. Enabled OSPF

To activate the routing engine, you need to create a configuration file for the protocol daemon, and also for *Zebra*. Zebra is Quagga's IP routing management daemon, which provides kernel routing table updates, interface lookups, and redistribution of routes between the routing protocols.

Note: To view examples of the configuration files, browse to http://www.quagga.net/docs/quagga.pdf.

3. Enter the configuration files into their respective code fields. Alternatively, click the 'Set Default Values' button to the right of each code field. The default values, displayed in a field are the following:

   - **BGP** :

     !router bgp <AS number> The exclamation mark is Quagga's comment character. The `router bgp` string is a command that activates the BGP daemon. The exclamation mark emphasizes that the command must be followed by an exact Autonomous System's ID number.

     log syslog A command that instructs the daemon to send its log messages to the system log.

   - **OSPF** :

     router ospf A command that activates the OSPF daemon.

     log syslog See the explanation under BGP.

   - **Zebra**

     interface ixp1 Instructs the daemon to query and update routing information via a specific WAN device. It is important that you change the default `ixp1` value to your WAN device name.

     log syslog See the explanation under BGP.

4. Click 'OK' to save the settings.

If the OSPF daemon is activated, OpenRG starts sending the 'Hello' packets to other routers to create adjacencies. After determining the shortest path to each of the neighboring routers, Zebra updates the routing table according to the network changes. If the BGP deamon is activated, OpenRG starts to advertise routes it uses to other BGP-enabled network devices located in the neighboring Autonomous System(s). The BGP protocol uses TCP as its transport protocol. Therefore, OpenRG first establishes a TCP connection to routers with which it will communicate. *KeepAlive* messages are sent periodically to ensure the liveness of the connection. When a change in the routing table occurs, OpenRG advertises an *Update* message to its peers. This update message adds a new route or removes the unfeasible one from their routing table.

8.6.4. PPPoE Relay

PPPoE Relay enables OpenRG to relay packets on PPPoE connections, while keeping its designated functionality for any additional connections. The PPPoE Relay screen (see figure Figure 8.348) displays a check-box that enables PPPoE Relay.

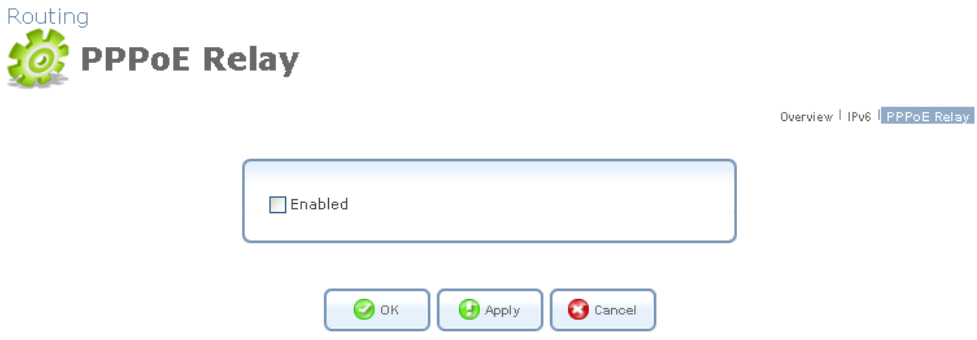


Figure 8.348. PPPoE Relay

8.7. Management

8.7.1. Universal Plug and Play

Universal Plug-and-Play is a networking architecture that provides compatibility among networking equipment, software and peripherals. UPnP OpenRG™ -enabled products can seamlessly connect and communicate with other Universal Plug-and-Play enabled devices, without the need for user configuration, centralized servers, or product-specific device drivers. This technology leverages existing standards and technologies, including TCP/IP, HTTP 1.1 and XML, facilitating the incorporation of Universal Plug-and-Play capabilities into a wide range of networked products for the home. Universal Plug-and-Play technologies are rapidly adopted and integrated into widely-used consumer products such as Windows XP. Therefore it is critical that today's Residential Gateways be UPnP-compliant. Your gateway is at the forefront of this development, offering a complete software platform for UPnP devices. This means that any UPnP-enabled *control point* (client) can dynamically join the network, obtain an IP address and exchange information about its capabilities and those of other computers on the network. They can subsequently communicate with each other directly, thereby further enabling peer-to-peer networking. And this all happens automatically, providing a truly zero-configuration network.

8.7.1.1. UPnP on OpenRG

If your computer is running an operating system that supports UPnP, such as *Windows XP*, you can add the computer to your home network and access the Web-based Management directly from within Windows.

- To add a UPnP-enabled computer to the home network:

  1. Connect the PC to the gateway.

  2. The PC will automatically be recognized and added to the home network. OpenRG will be added to 'My Network Places' as the Internet Gateway Device and will allow configuration via a standard Windows interface.

  3. A message appears on the notification area of the Taskbar notifying that the PC has been added to the network.

- To access the WBM directly from Windows:

  1. Open the 'My Network Places' window by double-clicking its desktop icon (see figure Figure 8.349).

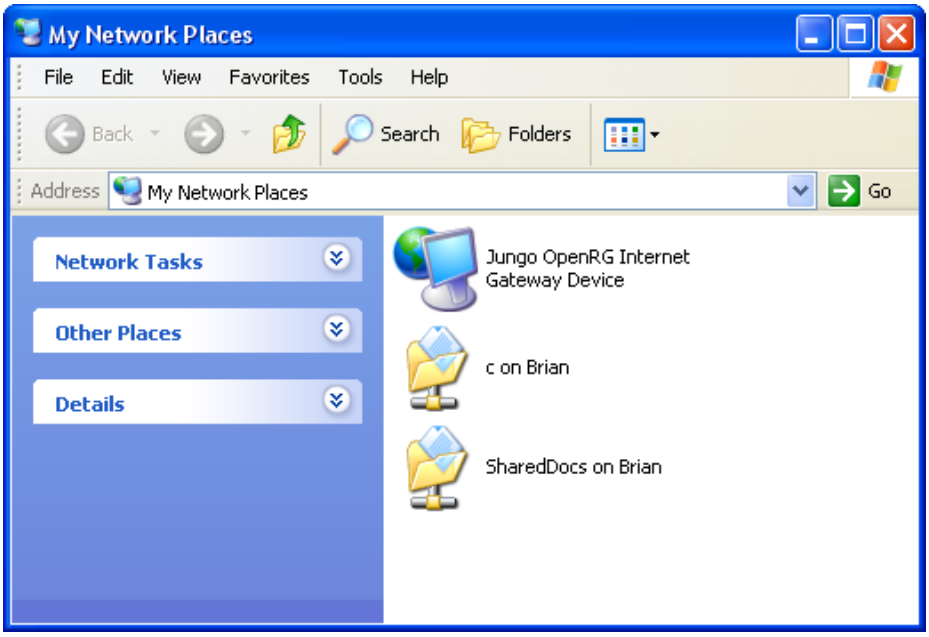


Figure 8.349. My Network Places

2. Double-click the 'Internet Gateway Device' icon. The WBM login screen appears in a browser window. This method is similar to opening a browser window and typing in '192.168.1.1'.

- To monitor the status of the connection between OpenRG and the Internet:

1. Open the 'Network Connections' control panel.

2. Double-click 'Internet Connection' icon. The 'Internet Connection Status' window appears:

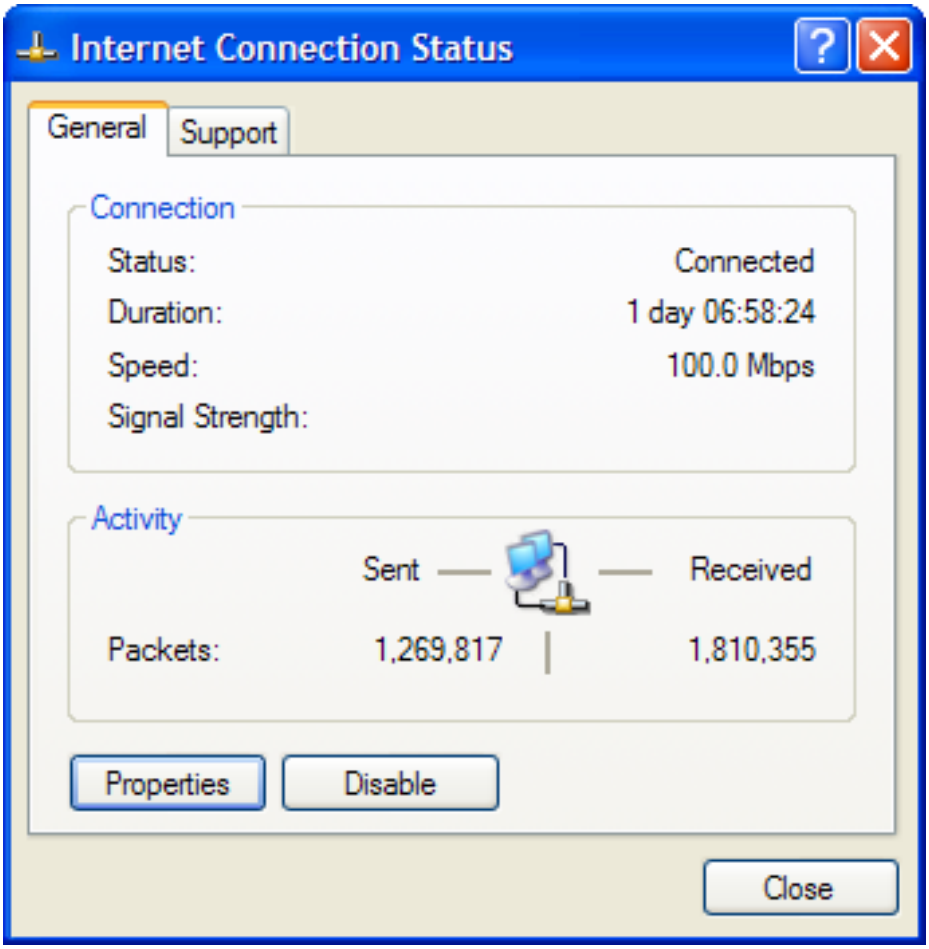


Figure 8.350. Internet Connection Status

You may also make services provided by computers in the home network available to computers on the Internet. For example, you may designate a PC in your home network to act as a Web server, allowing computers on the Internet to request pages from it. Or a game that you want to play over the Internet may require that specific ports be opened to allow communication between your PC and other players. Please refer to section Section 7.3.3 for more information.

- To make local services available to computers on the Internet:

  1. Open the 'Network Connections' control panel.

  2. Right-click 'Internet Connection' and choose 'Properties'. The 'Internet Connection Properties' window appears:

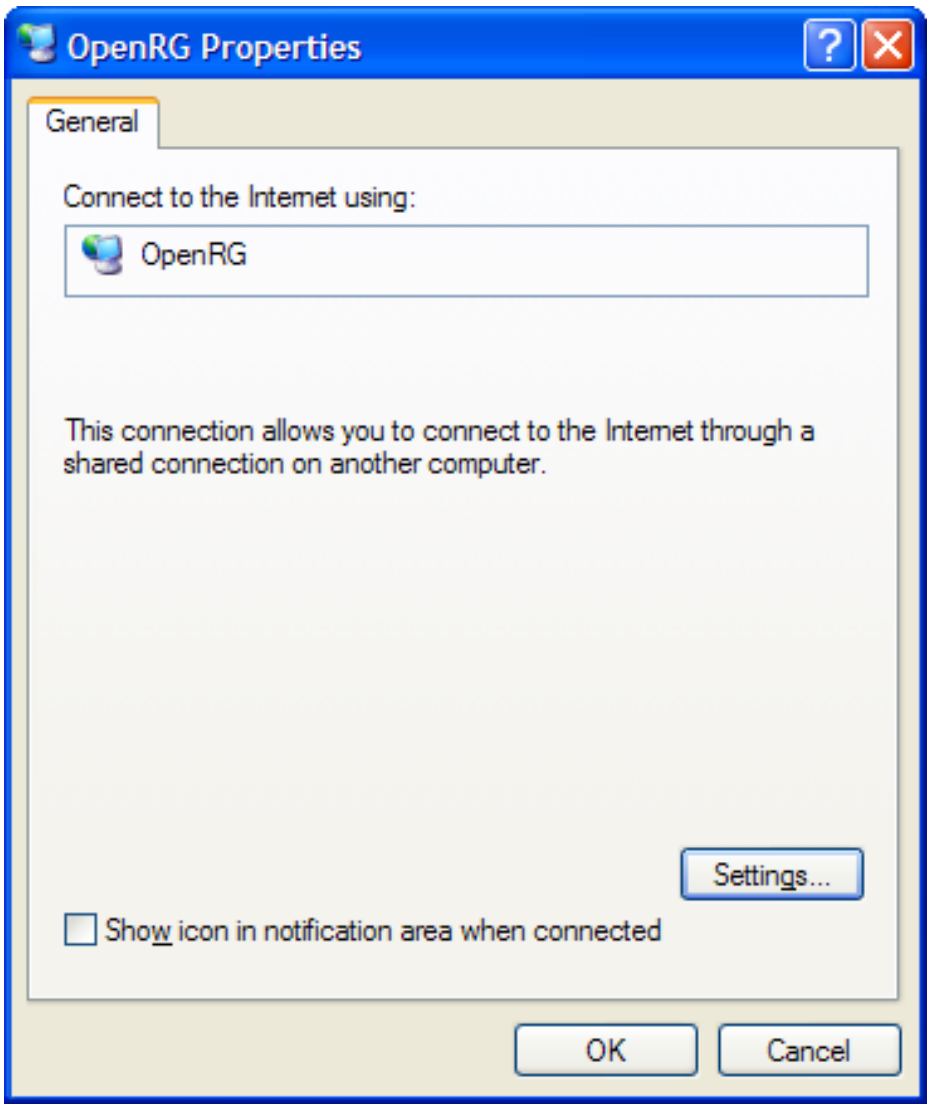


Figure 8.351. Internet Connection Properties

3. Press the 'Settings' button. The 'Advanced Settings' window will appear (see figure Figure 8.352).

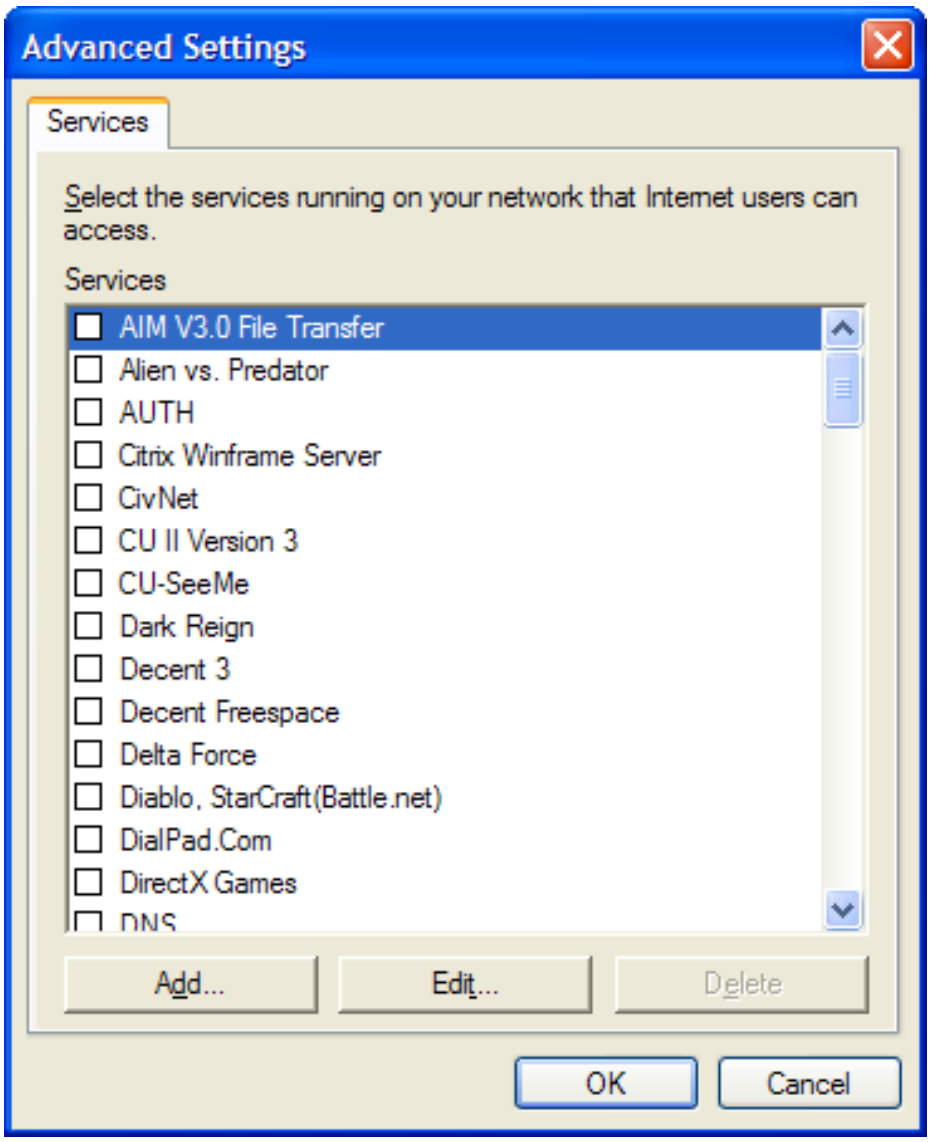


Figure 8.352. Advanced Settings

4. Select a local service that you would like to make available to computers on the Internet. The 'Service Settings' window will automatically appear (see figure Figure 8.353).

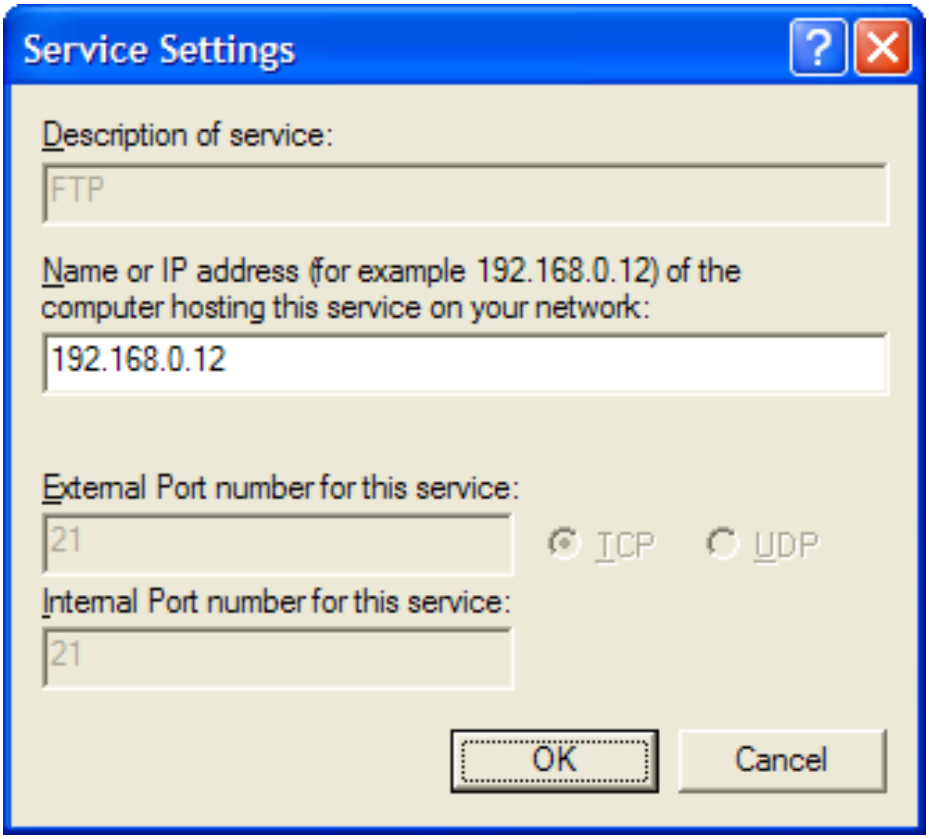


Figure 8.353. Service Settings: Edit Service

5. Enter the local IP address of the computer that provides this service and click 'OK'.
6. Select other services as desired and repeat the previous step for each.
7. Click 'OK' to save the settings.

- To add a local service that is not listed in the 'Advanced Settings' window:

1. Follow steps 1-3 above.
2. Press the 'Add...' button. The 'Service Settings' window will appear (see figure Figure 8.354).

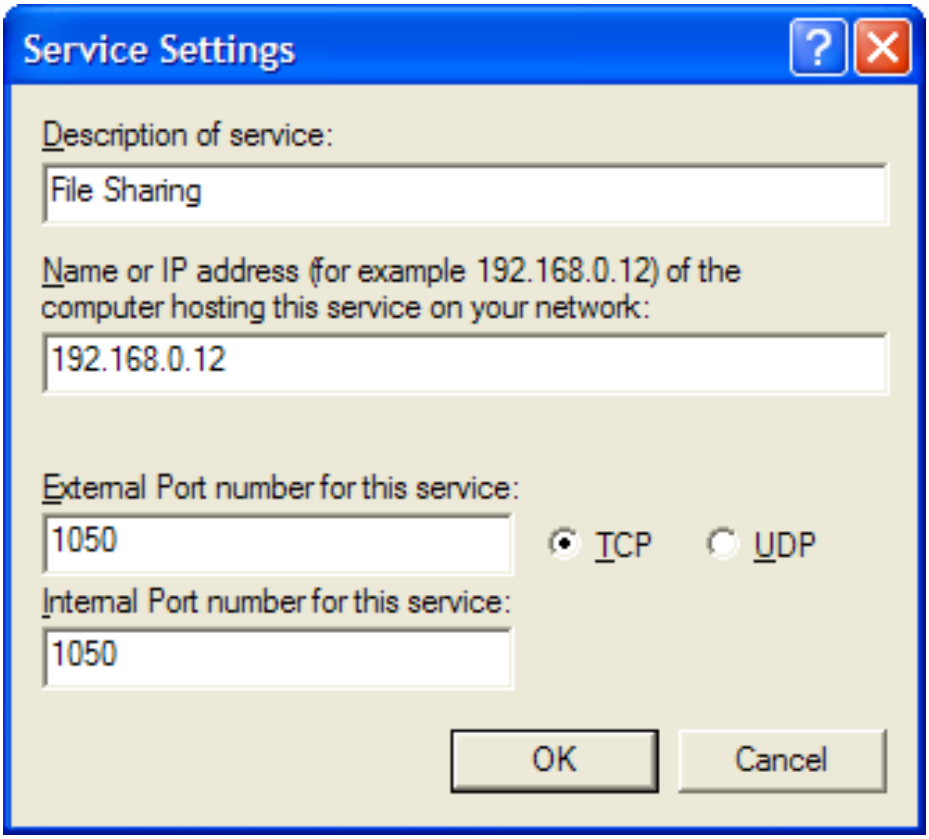


Figure 8.354. Service Settings: Add Service

3. Complete the fields as indicated in the window.
4. Click 'OK' to close the window and return to the 'Advanced Settings' window. The service will be selected.
5. Click 'OK' to save the settings.

8.7.1.2. UPnP Configuration

The UPnP feature is enabled by default. Access its settings either from the 'Management' tab under the 'System' screen, or by clicking the 'Universal Plug and Play' icon in the 'Advanced' screen. The 'Universal Plug and Play' settings screen appears:

Management
Universal Plug and Play
Universal Plug and Play | Simple Network Management Protocol (SNMP) | Remote Administration | SSH
Allow Other Network Users to Control OpenRG's Network Features
Enable Automatic Cleanup of Old Unused UPnP Services
WAN Connection Publication:
Publish Only the Main WAN Connection
OK
Apply
Cancel

Figure 8.355. Universal Plug and Play

Allow Other Network Users to Control OpenRG's Network Features Select this check-box to enable the UPnP feature. This will enable you to define UPnP services on any of the LAN hosts.

Enable Automatic Cleanup of Old Unused UPnP Services Select this check-box to enable automatic cleanup of invalid rules. This feature checks the validity of all UPnP services every 5 minutes, and removes old and obsolete services, unless a user-defined rule depends on them (see chapter Section 7.3).

WAN Connection Publication By default, OpenRG will publish only its main WAN connection, which will be controllable by UPnP entities. However, you may select the 'Publish All WAN Connections' option if you wish to grant UPnP control over all of OpenRG's WAN connections.

8.7.2. Simple Network Management Protocol

Simple Network Management Protocol (SNMP) enables network management systems to remotely configure and monitor OpenRG. Your Internet Service Provider (ISP) may use SNMP in order to identify and resolve technical problems. Technical information regarding the properties of OpenRG's SNMP agent should be provided by your ISP. To configure OpenRG's SNMP agent, perform the following:

1. Access this feature either from the 'Management' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'SNMP' screen appears:

Figure 8.356. SNMP Management

2. Specify the SNMP parameters, as provided by your Internet service provider:
   Allow Incoming WAN Access to SNMP Check this box to allow access to OpenRG's SNMP over the Internet.

   Read-only/Write Community Names SNMP community strings are passwords used in SNMP messages between the management system and OpenRG. A read-only community allows the manager to monitor OpenRG. A read-write community allows the manager to both monitor and configure OpenRG.

   Trusted Peer The IP address, or subnet of addresses, that identify which remote management stations are allowed to perform SNMP operations on OpenRG.

   SNMP Traps Messages sent by OpenRG to a remote management station, in order to notify the manager about the occurrence of important events or serious conditions. OpenRG supports both SNMP version 1 and SNMP version 2c traps. Check the Enabled check box to enable this feature. The screen refreshes, displaying the following fields:

Figure 8.357. SNMP Traps

Version Select between version SNMP v1 and SNMP v2c.

Destination The remote management station's IP address.

Community Enter the community name that will be associated with the trap messages.

8.7.2.1. Defining an SNMPv3 User Account

Simple Network Management Protocol version 3 (SNMPv3) enables you to perform certain management and monitoring operations on OpenRG outside its WBM. Information is exchanged between a management station and OpenRG's SNMP agent in the form of an SNMP message. The advantage of the third version of SNMP over the previous versions is that it provides user authentication, privacy, and access control. SNMPv3 specifies a User Security Model (USM) that defines the need to create an SNMP user account, in order to secure the information exchange between the management station and the SNMP agent. The following example demonstrates how to define an SNMPv3 user account in OpenRG. Let's assume that you want to add a new SNMPv3 user called "admin". For this purpose, perform the following steps:

1. Add the SNMPv3 user account to the USM table.
2. Associate the user with a new or an existing group.
3. Associate the group with specific views.
4. Create the group views.

Step 1 is performed from OpenRG's CLI. Steps 2--4 are performed from a Linux shell, as in the following example.

1. Add the new user (admin) to the USM table, by running the following `conf set` commands from OpenRG's CLI:

```
OpenRG> conf set /snmp/mibs/usm_mib/usmuser_table/13.128.0.42.47.128.242.184.29.85.234.15
.79.65.5.97.100.109.105.110/name admin

OpenRG> conf set /snmp/mibs/usm_mib/usmuser_table/13.128.0.42.47.128.242.184.29.85.234.15
.79.65.5.97.100.109.105.110/security_name admin

OpenRG> conf set /snmp/mibs/usm_mib/usmuser_table/13.128.0.42.47.128.242.184.29.85.234.15
.79.65.5.97.100.109.105.110/public ""

OpenRG> conf set /snmp/mibs/usm_mib/usmuser_table/13.128.0.42.47.128.242.184.29.85.234.15
.79.65.5.97.100.109.105.110/auth_protocol 1.3.6.1.6.3.10.1.1.1

OpenRG> conf set /snmp/mibs/usm_mib/usmuser_table/13.128.0.42.47.128.242.184.29.85.234.15
.79.65.5.97.100.109.105.110/priv_protocol 1.3.6.1.6.3.10.1.2.1

OpenRG> conf set /snmp/mibs/usm_mib/usmuser_table/13.128.0.42.47.128.242.184.29.85.234.15
.79.65.5.97.100.109.105.110/storage_type 3

OpenRG> conf set /snmp/mibs/usm_mib/usmuser_table/13.128.0.42.47.128.242.184.29.85.234.15
.79.65.5.97.100.109.105.110/row_status 1

OpenRG> conf set /snmp/mibs/usm_mib/usmuser_table/13.128.0.42.47.128.242.184.29.85.234.15
.79.65.5.97.100.109.105.110/clone_from 0.0
```

```
OpenRG> conf set /snmp/mibs/usm_mib/usmuser_table/13.128.0.42.47.128.242.184.29.85.234.15
.79.65.5.97.100.109.105.110/engine_id <ENGINE_ID>
```

The sub-OID 13.128.0.42.47.128.242.184.29.85.234.15.79.65 stands for the engine ID (with length of 13 octets). The decimal values of each engine ID are permanent. The sub-OID 5.97.100.109.105.110 stands for "admin" (5 octets, according to the word length). The decimal values of the user name appear as defined in the ASCII table. The <ENGINE_ID> parameter should be taken from the engine ID in the output of the following command:

```
OpenRG> conf print /snmp/persist_conf
```

Note: You should copy the engine ID without the "0x" prefix.

After the commands specified above are issued, the authentication protocol is set to `usmNoAuthProtocol` (which has OID 1.3.6.1.6.3.10.1.1.1), and the privacy protocol is set to `usmNoPrivProtocol` (which has OID 1.3.6.1.6.3.10.1.2.1).

2. Associate the user with a group. The associated group can be either a new group or an existing group. For example, to add a new group called "admin_group" and associate it with the user "admin", run the following `SNMP SET` commands from a Linux shell:

```
$ snmpset -v2c -c private <OpenRG's IP address> vacmSecurityToGroupStatus.3.5.97.100.109.105
.110 i createAndWait

$ snmpset -v2c -c private <OpenRG's IP address> vacmGroupName.3.5.97.100.109.105.110 s
admin_group

$ snmpset -v2c -c private <OpenRG's IP address> vacmSecurityToGroupStorageType.3.5.97.100
.109.105.110 i nonVolatile

$ snmpset -v2c -c private <OpenRG's IP address> vacmSecurityToGroupStatus.3.5.97.100.109.105
.110 i active
```

The sub-OID 5.97.100.109.105.110 stands for "admin" (with length of 5 octets). These commands populate `vacmSecurityToGroupTable` with a new group called "admin_group".

3. Associate between the group and its views. For example, suppose you want to associate "admin_group" with a view called "admin_view" for reading, writing and notifications, with security level of `noAuthNoPriv` . You can do this by running the following `SNMP SET` commands from a Linux shell:

```
$ snmpset -v2c -c private <OpenRG's IP address> vacmAccessStatus.11.97.100.109.105.110.95
.103.114.111.117.112.0.3.1 i createAndWait

$ snmpset -v2c -c private <OpenRG's IP address> vacmAccessContextMatch.11.97.100.109.105.110
.95.103.114.111.117.112.0.3.1 i exact

$ snmpset -v2c -c private <OpenRG's IP address> vacmAccessReadViewName.11.97.100.109.105.110
.95.103.114.111.117.112.0.3.1 s admin_view

$ snmpset -v2c -c private <OpenRG's IP address> vacmAccessWriteViewName.11.97.100.109.105
.110.95.103.114.111.117.112.0.3.1 s admin_view

$ snmpset -v2c -c private <OpenRG's IP address> vacmAccessNotifyViewName.11.97.100.109.105
.110.95.103.114.111.117.112.0.3.1 s admin_view

$ snmpset -v2c -c private <OpenRG's IP address> vacmAccessStorageType.11.97.100.109.105.110
.95.103.114.111.117.112.0.3.1 i nonVolatile

$ snmpset -v2c -c private <OpenRG's IP address> vacmAccessStatus.11.97.100.109.105.110.95
.103.114.111.117.112.0.3.1 i active
```

The sub-OID 11.97.100.109.105.110.95.103.114.111.117.112 stands for "admin_group" (with length of 11 octets).

4. Create the needed views. For example, suppose you want to define "admin_view" as a view that includes all the 1.3 subtree. You can do this by running the following SNMP SET commands:

```
$ snmpset -v2c -c private <OpenRG's IP address> vacmViewTreeFamilyStatus.10.97.100.109.105
.110.95.118.105.101.119.2.1.3 i createAndWait

$ snmpset -v2c -c private <OpenRG's IP address> vacmViewTreeFamilyType.10.97.100.109.105.110
.95.118.105.101.119.2.1.3 i included

$ snmpset -v2c -c private <OpenRG's IP address> vacmViewTreeFamilyStorageType.10.97.100.109
.105.110.95.118.105.101.119.2.1.3 i nonVolatile

$ snmpset -v2c -c private <OpenRG's IP address> vacmViewTreeFamilyStatus.10.97.100.109.105
.110.95.118.105.101.119.2.1.3 i active
```

   The sub-OID 10.97.100.109.105.110.95.118.105.101.119 stands for "admin_view".

After completing these steps, you will have an SNMPv3 user account defined in OpenRG. The following is a sample SNMPv3 query issued to OpenRG's SNMP agent:

```
$ snmpwalk -v 3 -u admin -l noAuthNoPriv 192.168.1.1
```

8.7.3. Remote Administration

It is possible to access and control OpenRG not only from within the home network, but also from the Internet. This allows you to view or change settings while travelling. It also enables you to allow your ISP to change settings or help you troubleshoot functionality or communication issues from a remote location.
Remote access to OpenRG is blocked by default to ensure the security of your home network. However, remote access is supported by the following services, and you may use the 'Remote Administration' screen to selectively enable these services if they are needed. To view OpenRG's remote administration options, access this feature either from the 'Management' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'Remote Administration' screen appears:

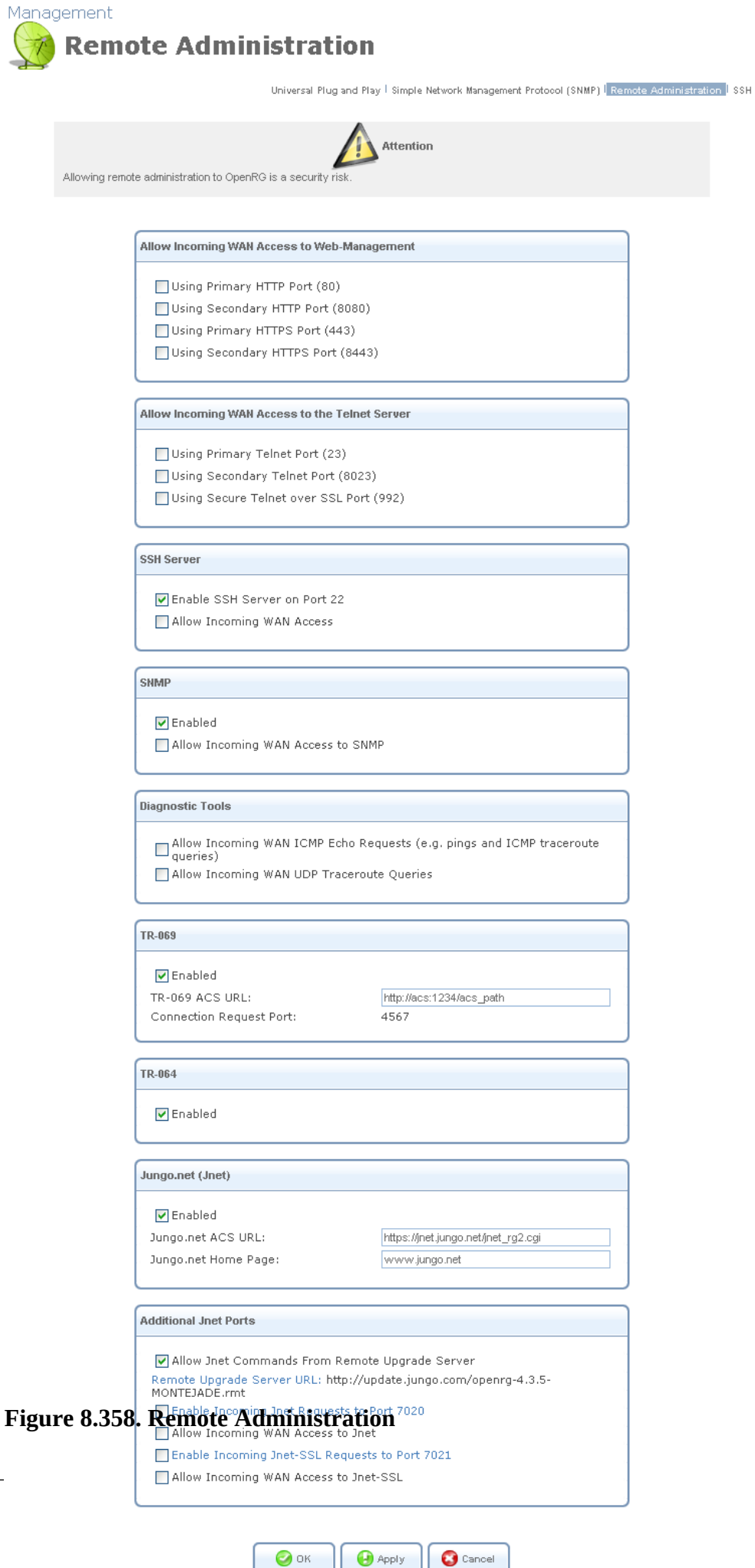

Management
Remote Administration
Universal Plug and Play | Simple Network Management Protocol (SNMP) | Remote Administration | SSH
Attention
Allowing remote administration to OpenRG is a security risk.
Allow Incoming WAN Access to Web-Management
Using Primary HTTP Port (80)
Using Secondary HTTP Port (8080)
Using Primary HTTPS Port (443)
Using Secondary HTTPS Port (8443)
Allow Incoming WAN Access to the Telnet Server
Using Primary Telnet Port (23)
Using Secondary Telnet Port (8023)
Using Secure Telnet over SSL Port (992)
SSH Server
Enable SSH Server on Port 22
Allow Incoming WAN Access
SNMP
Enabled
Allow Incoming WAN Access to SNMP
Diagnostic Tools
Allow Incoming WAN ICMP Echo Requests (e.g. pings and ICMP traceroute queries)
Allow Incoming WAN UDP Traceroute Queries
TR-069
Enabled
TR-069 ACS URL:
http://acs:1234/acs_path
Connection Request Port:
4567
TR-064
Enabled
Jungo.net (Jnet)
Enabled
Jungo.net ACS URL:
https://jnet.jungo.net/jnet_rg2.cgi
Jungo.net Home Page:
www.jungo.net
Additional Jnet Ports
Allow Jnet Commands From Remote Upgrade Server
Remote Upgrade Server URL: http://update.jungo.com/openrg-4.3.5-MONTEJADE.rmt
Enable Incoming Jnet Requests to Port 7020
Allow Incoming WAN Access to Jnet
Enable Incoming Jnet-SSL Requests to Port 7021
Allow Incoming WAN Access to Jnet-SSL
OK
Apply
Cancel

Figure 8.358. Remote Administration

Allow Incoming Access to the Web-Management Used to obtain access to the Web-based Management and gain access to all system settings and parameters (using a browser). Both secure (HTTPS) and non-secure (HTTP) access is available.

Allow Incoming Access to the Telnet Server Used to create a command-line session and gain access to all system settings and parameters (using a text-based terminal).

Allow Incoming Access to the SSH Server Similar to Telnet, this protocol is used to create a secured command-line session and gain access to all system settings and parameters.

Note: Web-Management, Telnet and SSH may be used to modify settings of the firewall or disable it. The user may also change local IP addresses and other settings, making it difficult or impossible to access the gateway from the home network. Therefore, remote access to Telnet or HTTP services **should be blocked** and should only be permitted when absolutely necessary.

Allow SNMP Control and Diagnostic Requests Used to allow Simple Network Management Protocol (SNMP) requests to remotely configure and monitor OpenRG. For more information, please refer to section Section 8.7.2.

Diagnostic Tools Used for troubleshooting and remote system management by you or your Internet Service Provider. The utilities that can be used are Ping and Traceroute (over UDP).

TR-069 TR-069 is a WAN management protocol intended for communication between Customer Premise Equipment (CPE) and an Auto-Configuration Server (ACS). It defines a mechanism that encompasses secure auto configuration of a CPE, and also incorporates other CPE management functions into a common framework.

TR-064 As residential gateways offer increasingly complex services, customer premise installation and configuration increase the operators' operational costs. DSL Forum's LAN-Side DSL CPE Configuration protocol, known as TR-064, provides a zero-touch solution for automating the installation and configuration of gateways from the LAN side.

JCMS Outgoing The Jungo Configuration Management System for outgoing traffic is used for remote management of OpenRG by the remote upgrade server, during a remote upgrade session.

JCMS Incoming Jungo's proprietary remote administration protocol, used to create a command-line session and gain access to all system settings and parameters.
To allow remote access to OpenRG services:

1. Select the services that you would like to make available to computers on the Internet. The following should be taken into consideration:

   - Although Telnet service is password-protected, it is not considered a secured protocol. When allowing incoming access to a Telnet server, if port forwarding is configured to use port 23, select port 8023 to avoid conflicts.

   - When allowing incoming access to the Web-based management, if port forwarding is configured to use port 80, select port 8080 to avoid conflicts.

2. Click 'OK' to save the settings.

Encrypted remote administration is performed using a secure SSL connection, which requires an SSL certificate. When accessing OpenRG for the first time using encrypted remote administration, you will encounter a warning message generated by your browser regarding certificate authentication. This is due to the fact that OpenRG's SSL certificate is self-generated. When encountering this message under these circumstances, ignore it and continue. It should be noted that even though this message appears, the self-generated certificate is safe, and provides you with a secure SSL connection. It is also possible to assign a user-defined certificate to OpenRG. To learn about certificates, see chapter Section 8.9.4 .

8.7.4. Secure Shell

Secure Shell (SSH) is a protocol that provides encrypted connections to remote hosts or servers. OpenRG supports SSH connection requests from LAN clients with administrative permissions. When connected, a secured command-line session will grant a user access to all system settings and parameters. This service can also be opened to WAN clients. To learn more, please refer to section Section 8.7.3 . Access this feature either from its link in the 'Management' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'SSH' screen appears:

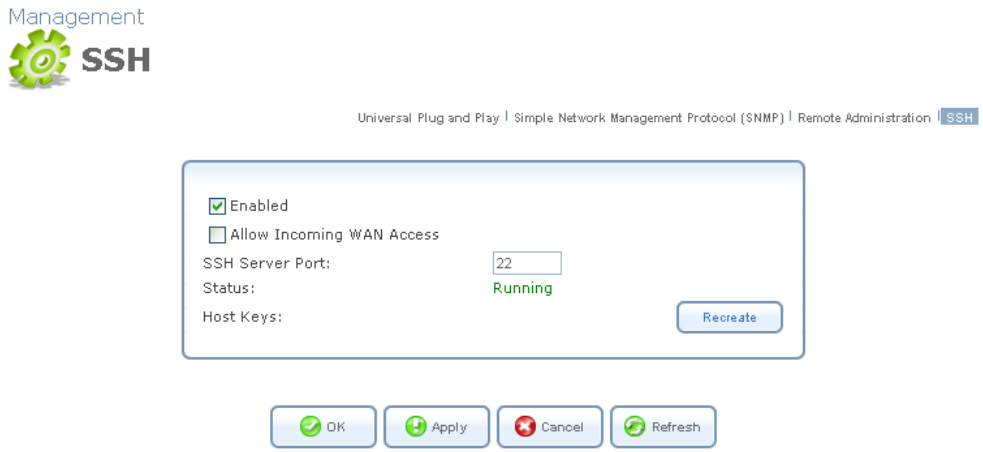


Figure 8.359. Secure Shell

Enabled Check or un-check this box to enable or disable this feature.

Allow Incoming WAN Access Check this box to open the SSH service to WAN clients.

SSH Server Port Specify the port that will be used for SSH traffic.

Status This feature is enabled by default, and its status appears as "Running". This status will change reflecting actions performed.

Host Keys Host keys are used to identify OpenRG to incoming SSH connection requests. You may wish to use new keys instead of the old ones. To do so, press the 'Recreate' button. The status will change to "Generating Host Keys" until the keys are created and saved in OpenRG's configuration file.

8.8. Maintenance

8.8.1. About OpenRG

The 'About OpenRG' screen (see figure Figure 8.360) presents various details about OpenRG's software version, such as version number, type of platform and list of features.

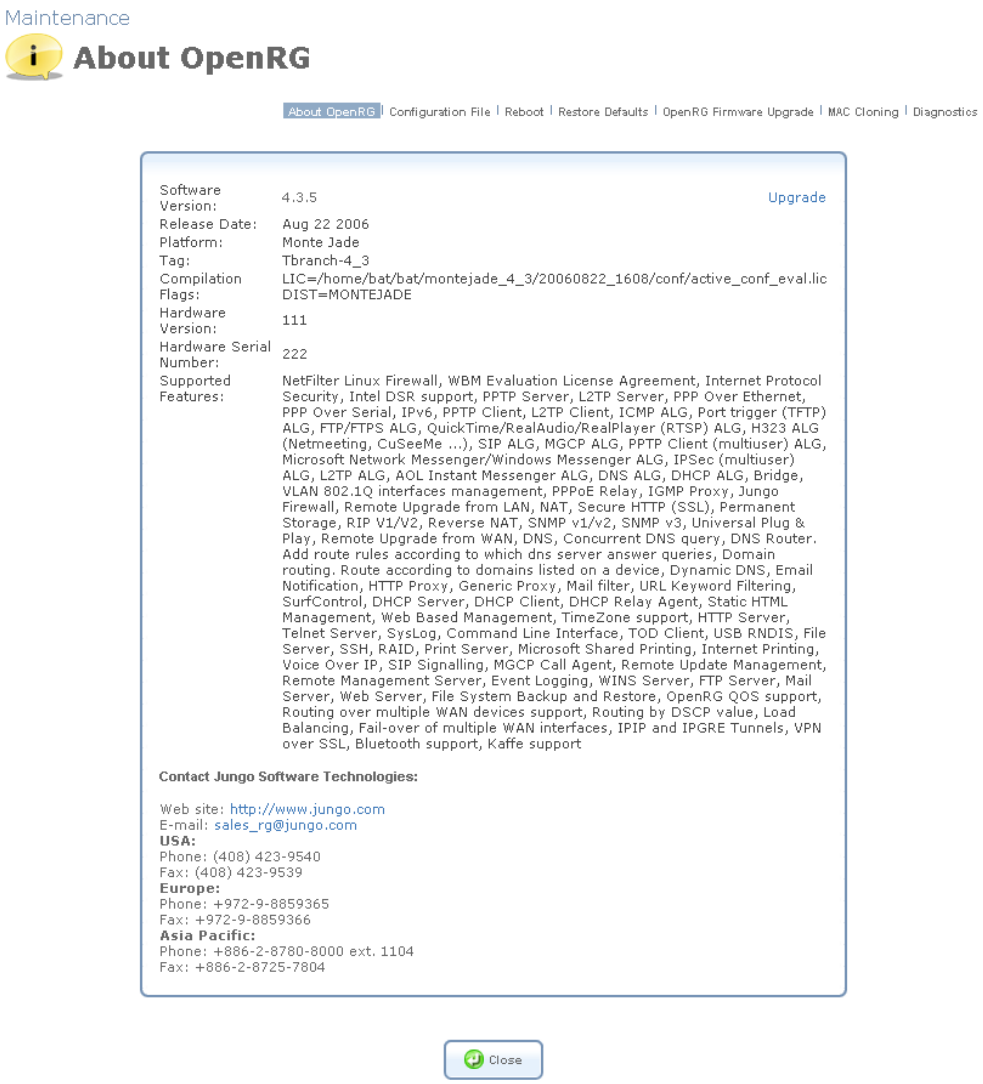

Maintenance
About OpenRG
About OpenRG | Configuration File | Reboot | Restore Defaults | OpenRG Firmware Upgrade | MAC Cloning | Diagnostics
Software Version: 4.3.5 Upgrade
Release Date: Aug 22 2006
Platform: Monte Jade
Tag: Tbranch-4_3
Compilation Flags: LIC=/home/bat/bat/montejade_4_3/20060822_1608/conf/active_conf_eval.lic DIST=MONTEJADE
Hardware Version: 111
Hardware Serial Number: 222
Supported Features: NetFilter Linux Firewall, WBM Evaluation License Agreement, Internet Protocol Security, Intel DSR support, PPTP Server, L2TP Server, PPP Over Ethernet, PPP Over Serial, IPv6, PPTP Client, L2TP Client, ICMP ALG, Port trigger (TFTP) ALG, FTP/FTPS ALG, QuickTime/RealAudio/RealPlayer (RTSP) ALG, H323 ALG (Netmeeting, CuSeeMe ...), SIP ALG, MGCP ALG, PPTP Client (multiuser) ALG, Microsoft Network Messenger/Windows Messenger ALG, IPSec (multiuser) ALG, L2TP ALG, AOL Instant Messenger ALG, DNS ALG, DHCP ALG, Bridge, VLAN 802.1Q interfaces management, PPPoE Relay, IGMP Proxy, Jungo Firewall, Remote Upgrade from LAN, NAT, Secure HTTP (SSL), Permanent Storage, RIP V1/V2, Reverse NAT, SNMP v1/v2, SNMP v3, Universal Plug & Play, Remote Upgrade from WAN, DNS, Concurrent DNS query, DNS Router. Add route rules according to which dns server answer queries, Domain routing. Route according to domains listed on a device, Dynamic DNS, Email Notification, HTTP Proxy, Generic Proxy, Mail filter, URL Keyword Filtering, SurfControl, DHCP Server, DHCP Client, DHCP Relay Agent, Static HTML Management, Web Based Management, TimeZone support, HTTP Server, Telnet Server, SysLog, Command Line Interface, TOD Client, USB RNDIS, File Server, SSH, RAID, Print Server, Microsoft Shared Printing, Internet Printing, Voice Over IP, SIP Signalling, MGCP Call Agent, Remote Update Management, Remote Management Server, Event Logging, WINS Server, FTP Server, Mail Server, Web Server, File System Backup and Restore, OpenRG QOS support, Routing over multiple WAN devices support, Routing by DSCP value, Load Balancing, Fail-over of multiple WAN interfaces, IPIP and IPGRE Tunnels, VPN over SSL, Bluetooth support, Kaffe support
Contact Jungo Software Technologies:
Web site: http://www.jungo.com
E-mail: sales_rg@jungo.com
USA:
Phone: (408) 423-9540
Fax: (408) 423-9539
Europe:
Phone: +972-9-8859365
Fax: +972-9-8859366
Asia Pacific:
Phone: +886-2-8780-8000 ext. 1104
Fax: +886-2-8725-7804
Close

Figure 8.360. About OpenRG

8.8.2. Configuration File

OpenRG enables you to view, save and load its configuration file in order to backup and restore your current configuration.

1. Access this feature either from the 'Maintenance' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'Configuration File' screen appears (see figure Figure 8.361), displaying the complete contents of OpenRG's configuration file.

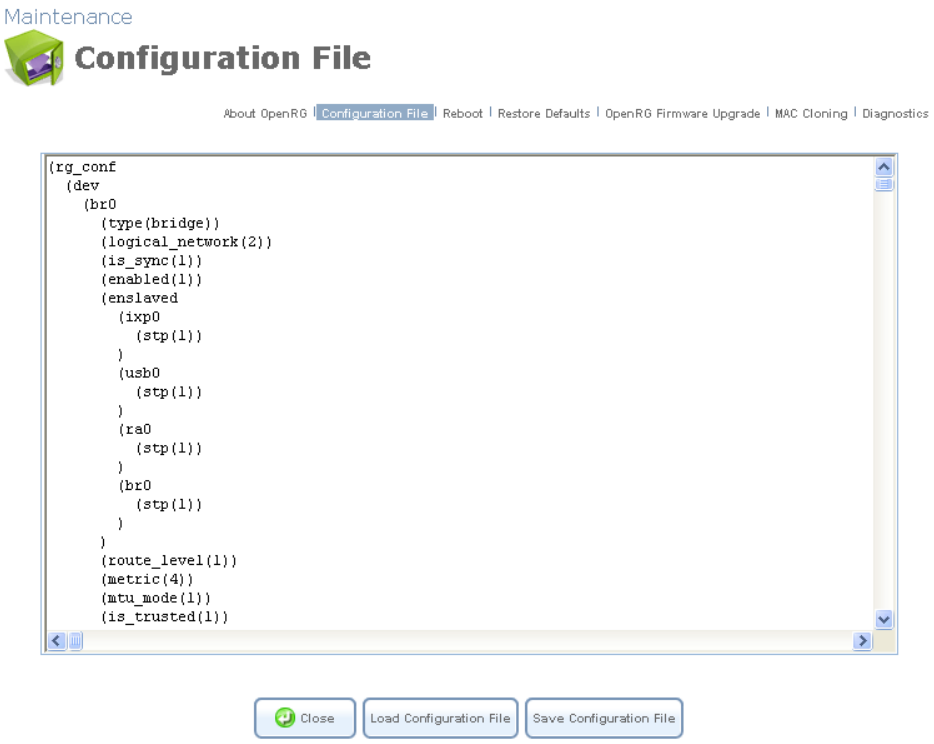


Figure 8.361. Configuration File

2. Press the 'Load Configuration File' button to restore your configuration from a file and restart OpenRG.

3. Press the 'Save Configuration File' button to backup your current configuration to a file.

Note: Upon reboot, OpenRG restores the settings from its configuration file. However, if reboot attempts fail three times consecutively, OpenRG will reset the configuration file by restoring factory defaults before attempting to reboot.

8.8.3. Reboot

To reboot OpenRG:

1. Access this feature either from the 'Maintenance' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'Reboot' screen appears:

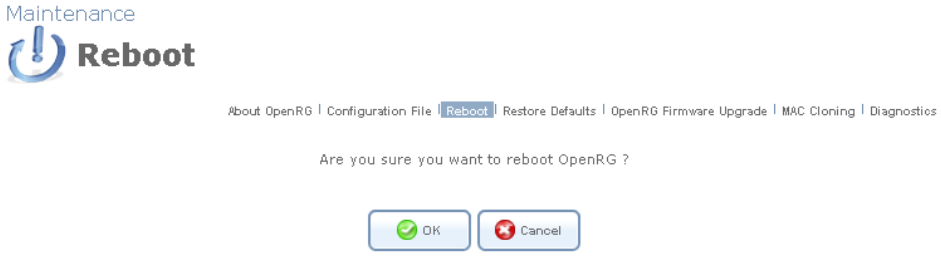

Maintenance
Reboot
About OpenRG | Configuration File | Reboot | Restore Defaults | OpenRG Firmware Upgrade | MAC Cloning | Diagnostics
Are you sure you want to reboot OpenRG ?
OK
Cancel

Figure 8.362. Reboot

2. Press 'OK' to reboot OpenRG. This may take up to one minute.

To re-enter the WBM after restarting the gateway, press the browser's 'Refresh' button.

8.8.4. Restore Defaults

Restoring OpenRG's factory default settings removes all of the configuration changes made to OpenRG. This is useful, for example, when you wish to build a new network from the beginning, or when you cannot recall changes made to the network and wish to go back to the default configuration. To restore default settings:

1. Access this feature either from the 'Maintenance' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'Restore Defaults' screen appears:

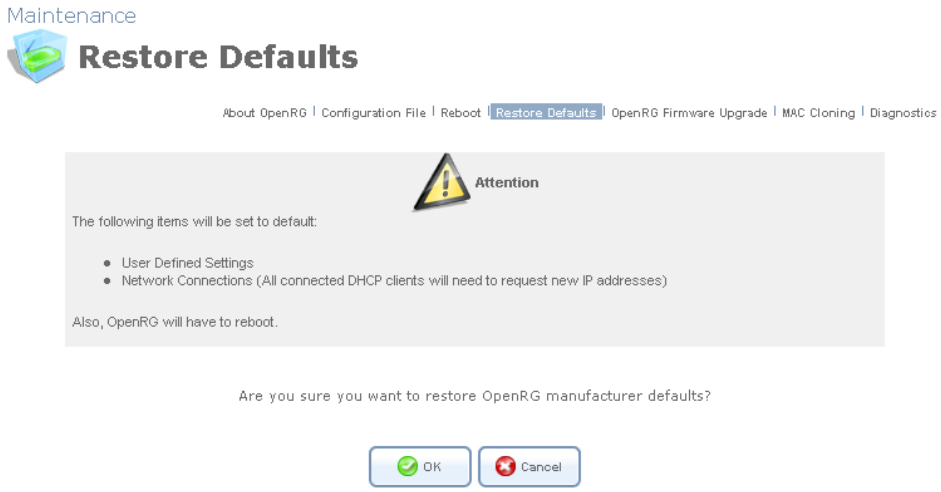

Maintenance
Restore Defaults
About OpenRG | Configuration File | Reboot | Restore Defaults | OpenRG Firmware Upgrade | MAC Cloning | Diagnostics
Attention
The following items will be set to default:
User Defined Settings
Network Connections (All connected DHCP clients will need to request new IP addresses)
Also, OpenRG will have to reboot.
Are you sure you want to restore OpenRG manufacturer defaults?
OK
Cancel

Figure 8.363. Restore Defaults

2. Press 'OK' to restore OpenRG's factory default settings.

Note: *All WBM settings and parameters*, not only those in the Advanced section, will be restored to their default values. This includes the administrator password; a user-specified password will no longer be valid.

8.8.5. OpenRG Firmware Upgrade

OpenRG offers a built-in mechanism for upgrading its software image, without losing any of your custom configurations and settings. There are two methods for upgrading the software image:

1. Upgrading from a local computer -- use a software image file pre-downloaded to your PC's disk drive or located on the accompanying evaluation CD.

2. Upgrading from the Internet -- also referred to as *Remote Update*, use this method to upgrade your firmware by remotely downloading an updated software image file.

Following are instructions for each of these methods.

8.8.5.1. Upgrading From a Local Computer

To upgrade OpenRG's software image using a locally available **.rmt** file:

1. Access this feature either from the 'Maintenance' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'OpenRG Firmware Upgrade' screen will appear (see figure Figure 8.364).

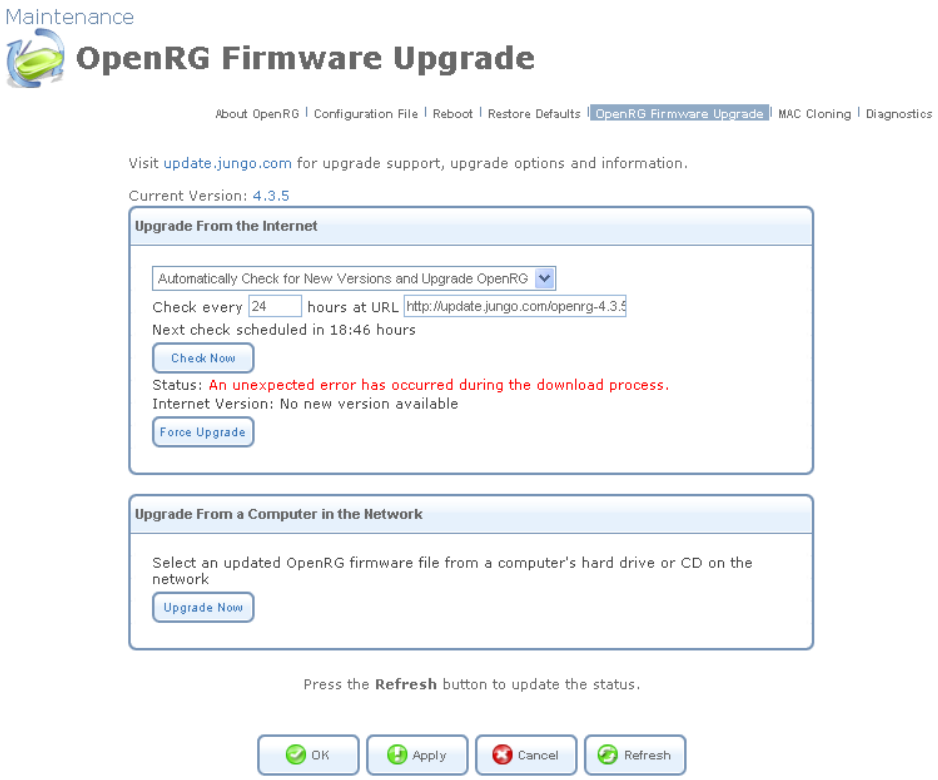

Maintenance
OpenRG Firmware Upgrade
About OpenRG | Configuration File | Reboot | Restore Defaults | OpenRG Firmware Upgrade | MAC Cloning | Diagnostics
Visit update.jungo.com for upgrade support, upgrade options and information.
Current Version: 4.3.5
Upgrade From the Internet
Automatically Check for New Versions and Upgrade OpenRG
Check every 24 hours at URL http://update.jungo.com/openrg-4.3.5
Next check scheduled in 18:46 hours
Check Now
Status: An unexpected error has occurred during the download process.
Internet Version: No new version available
Force Upgrade
Upgrade From a Computer in the Network
Select an updated OpenRG firmware file from a computer's hard drive or CD on the network
Upgrade Now
Press the Refresh button to update the status.
OK
Apply
Cancel
Refresh

Figure 8.364. OpenRG Firmware Upgrade

2. In the 'Upgrade From a Computer in the Network' section, press the 'Upgrade Now' button. The 'Upgrade From a Computer in the Network' screen will appear (see figure Figure 8.365).

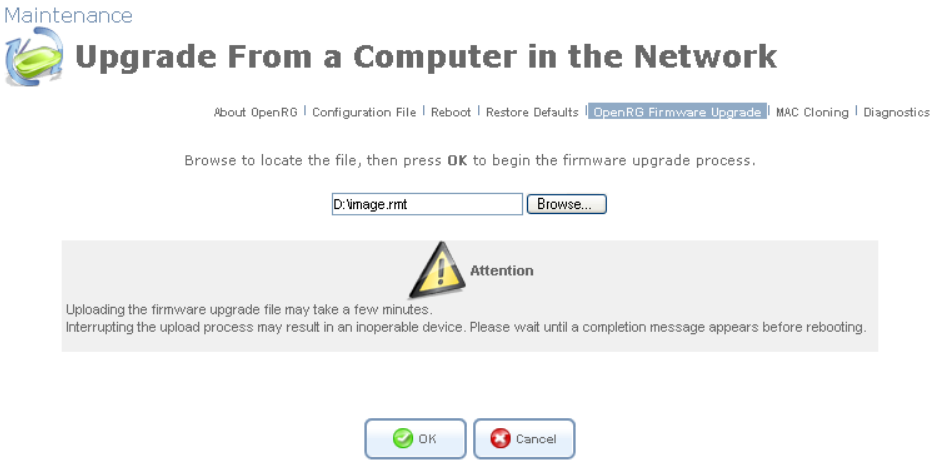

Maintenance
Upgrade From a Computer in the Network
About OpenRG | Configuration File | Reboot | Restore Defaults | OpenRG Firmware Upgrade | MAC Cloning | Diagnostics
Browse to locate the file, then press OK to begin the firmware upgrade process.
D:\image.rmt
Browse...
Attention
Uploading the firmware upgrade file may take a few minutes.
Interrupting the upload process may result in an inoperable device. Please wait until a completion message appears before rebooting.
OK
Cancel

Figure 8.365. Upgrade From a Computer in the Network

3. Enter the path of the software image file, or press the 'Browse' button to browse for the file on your PC, and click 'OK'.

Note: You can only use files with an ' **rmt** ' extension when performing the firmware upgrade procedure.

The file will start loading from your PC to your gateway. When loading is completed, the following confirmation screen will appear, asking you if you want to upgrade to the new version:

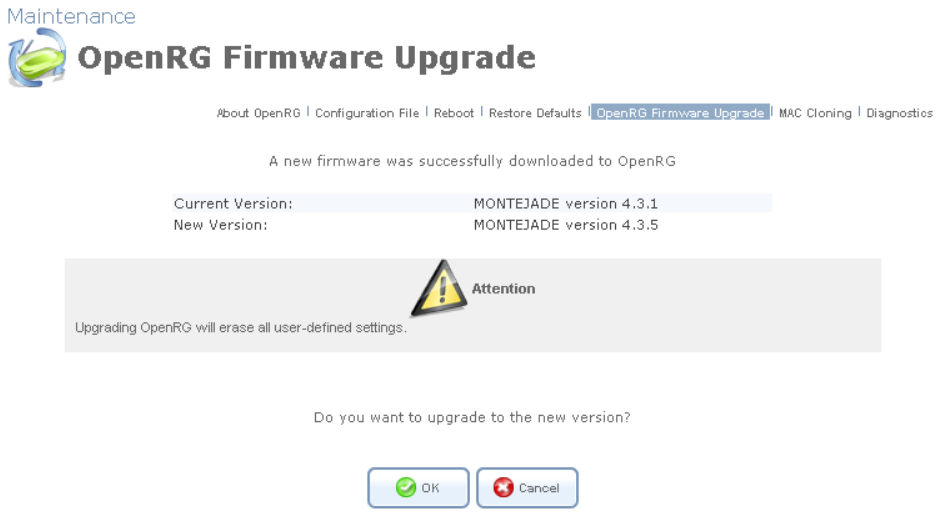

Maintenance
OpenRG Firmware Upgrade
About OpenRG | Configuration File | Reboot | Restore Defaults | OpenRG Firmware Upgrade | MAC Cloning | Diagnostics
A new firmware was successfully downloaded to OpenRG
Current Version: MONTEJADE version 4.3.1
New Version: MONTEJADE version 4.3.5
Attention
Upgrading OpenRG will erase all user-defined settings.
Do you want to upgrade to the new version?
OK
Cancel

Figure 8.366. Confirm Upgrade

4. Click 'OK' to confirm. When the upgrade process ends, OpenRG automatically reboots, and the login screen of the updated image is displayed. The new software maintains your custom configurations and settings.

8.8.5.2. Upgrading From the Internet

The **Remote Update** mechanism helps you keep your software image up-to-date, by performing routine daily [2] checks for newer software versions, as well as letting you perform manual checks. To view the automatic check utility's settings and last check result, click the 'OpenRG Firmware Upgrade' icon from the 'Advanced' screen. The 'OpenRG Firmware Upgrade' screen will appear (see figure Figure 8.364). In the 'Upgrade From the Internet' section, you can select the utility's checking method and interval. The result of the last performed check is displayed by the line between the 'Check Now' and 'Force Upgrade' buttons, indicating whether a new version is available or not.

- If a new version is available:

  1. Press the 'Force Upgrade' button. A download process will begin. When downloading is completed, a confirmation screen will appear (see figure Figure 8.366), asking you if you want to upgrade to the new version.

  2. Click 'OK' to confirm. The upgrade process will begin and should take no longer than one minute to complete.

  At the conclusion of the upgrade process OpenRG will automatically reboot. The new software version will run, maintaining your custom configurations and settings.

- If a new version is not available:

  1. Press the 'Check Now' button to perform an immediate check (instead of waiting for the next scheduled one). The screen will display a green "Check in progress..." message (see figure Figure 8.367).

[2] The Gateway must be connected to the Internet in order to communicate with the Remote Update server. Systems that store the time internally will attempt to connect and check for an update every 24 hours; systems that lack a BIOS battery will check each time the system restarts and at 24-hour intervals thereafter.

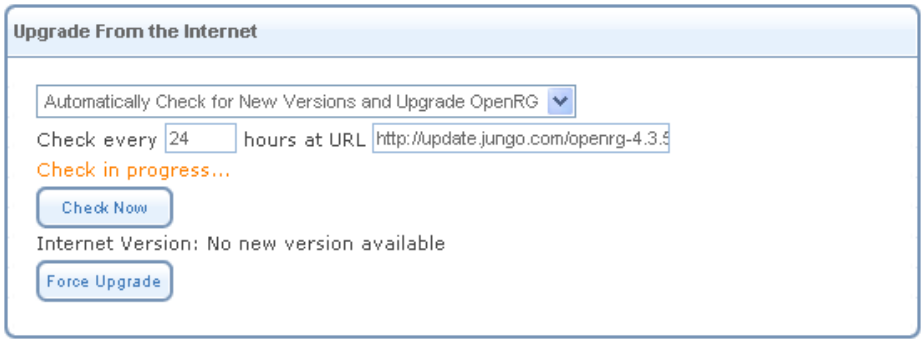

Upgrade From the Internet
Automatically Check for New Versions and Upgrade OpenRG
Check every 24 hours at URL http://update.jungo.com/openrg-4.3.5
Check in progress...
Check Now
Internet Version: No new version available
Force Upgrade

Figure 8.367. Remote Update Check

2. Press the 'Refresh' button until the check is completed and the result is displayed.

8.8.6. MAC Cloning

A Media Access Control (MAC) address is the numeric code that identifies a device on a network, such as your external cable/DSL modem or a PC network card. Your service provider may ask you to supply the MAC address of your PC, external modem, or both. When replacing an external modem with OpenRG, you can simplify the installation process by copying the MAC address of your existing PC to OpenRG. In such a case, you do not need to delay the setup process by informing your service provider of newly installed equipment. To use MAC cloning:

1. Access this feature either from the 'Maintenance' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'MAC Cloning' screen appears:

Maintenance
MAC Cloning
About OpenRG | Configuration File | Reboot | Restore Defaults | OpenRG Firmware Upgrade | MAC Cloning | Diagnostics
Set MAC of Device:
WAN Ethernet
To Physical Address:
22 : 8e : ce : d5 : 6b : d6
Clone My MAC Address
OK
Apply
Cancel

Figure 8.368. MAC Cloning Settings

2. Enter the physical MAC address to be cloned.

3. Press the 'Clone My MAC Address' button.

8.8.7. Diagnostics

The Diagnostics screen can assist you in testing network connectivity and viewing statistics, such as the number of packets transmitted and received, round-trip time and success status. Please note that the test tools depicted below are platform-dependent, and therefore may not all be available at once. Access this feature either from the 'Diagnostics' tab in the 'Internet Connection' screen, or by clicking its icon in the 'Advanced' screen. The 'Diagnostics' screen appears:

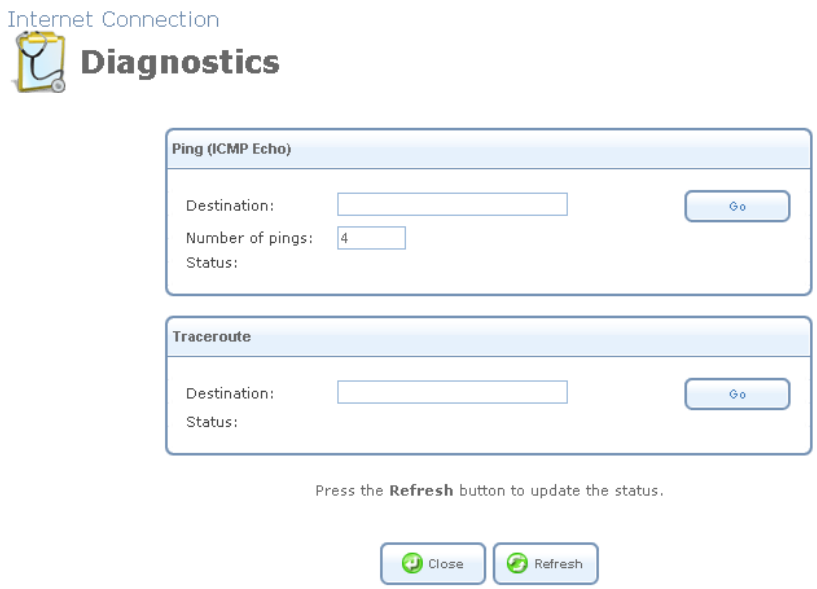


Figure 8.369. Advanced Diagnostics

8.8.7.1. Diagnosing Network Connectivity

To diagnose network connectivity, perform the following steps:

1. Under the Ping section, enter the IP address or URL to be tested in the 'Destination' field.
2. Enter the number of pings you would like to perform.
3. Press the 'Go' button.
4. In a few seconds, diagnostic statistics will be displayed. If no new information is displayed, press the 'Refresh' button.

8.8.7.2. Performing a Traceroute

To perform a traceroute, follow these steps:

1. Under the Traceroute section, enter the IP address or URL to be tested in the 'Destination' field.
2. Press the 'Go' button. A traceroute will commence, constantly refreshing the screen.
3. To stop the trace and view the results, press 'Cancel'.

8.8.7.3. Performing a PVC Scan

To perform a PVC scan, follow these steps:

1. Under the PVC Scan section, press the 'Go' button.
2. In a few seconds, diagnostic statistics will be displayed. If no new information is displayed, press the 'Refresh' button.

8.8.7.4. Performing an OAM Ping

To perform an OAM ping, follow these steps:

1. Under the OAM Ping section, select the type of OAM ping to perform:
   - F4 End-to-End
   - F4 Segment
   - F5 End-to-End
   - F5 Segment
2. Press the 'Go' button.
3. In a few seconds, diagnostic statistics will be displayed. If no new information is displayed, press the 'Refresh' button.

8.9. Objects and Rules

8.9.1. Protocols

The Protocols feature incorporates a list of preset and user-defined applications and common port settings. You can use protocols in various security features such as Access Control and Port Forwarding. You may add new protocols to support new applications or edit existing ones according to your needs. To view the basic protocols list, access this feature either from the 'Objects and Rules' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'Protocols' screen appears:

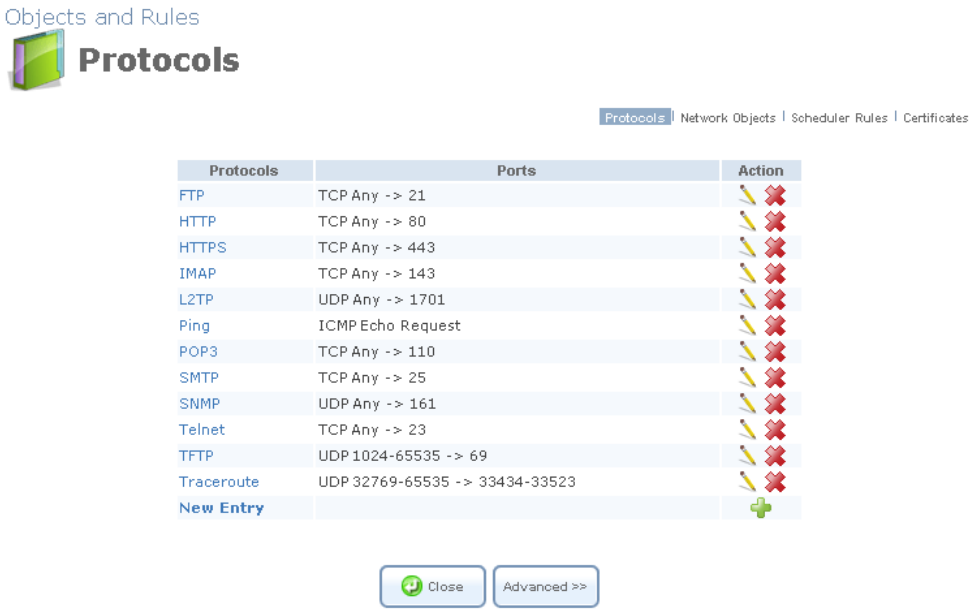


Figure 8.370. Protocols

Press the 'Advanced' button at the bottom of this screen for the full list of protocols supported by OpenRG. Note that toggling this view between 'Basic' and 'Advanced' is reflected throughout the WBM wherever the protocols list is displayed, and can be set back with 'Show All Services' and 'Show Basic Services', respectively. To define a protocol:

1. Click the 'New Entry' link in the 'Protocols' screen. The 'Edit Service' screen appears:

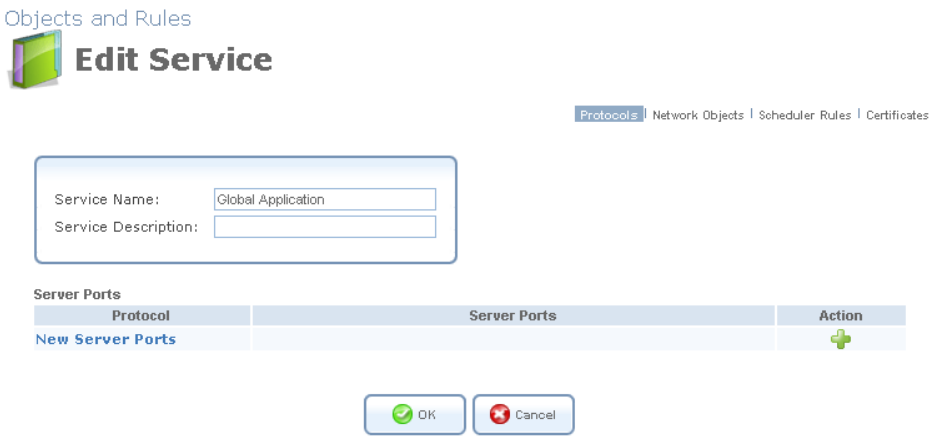


Figure 8.371. Edit Service

2. Name the service in the 'Service Name' field, and click the 'New Server Ports' link. The 'Edit Service Server Ports' screen appears (see figure Figure 8.372). You may choose any of the protocols available in the combo box, or add a new one by selecting 'Other'. When selecting a protocol from the combo box, the screen will refresh, presenting the respective fields by which to enter the relevant information.

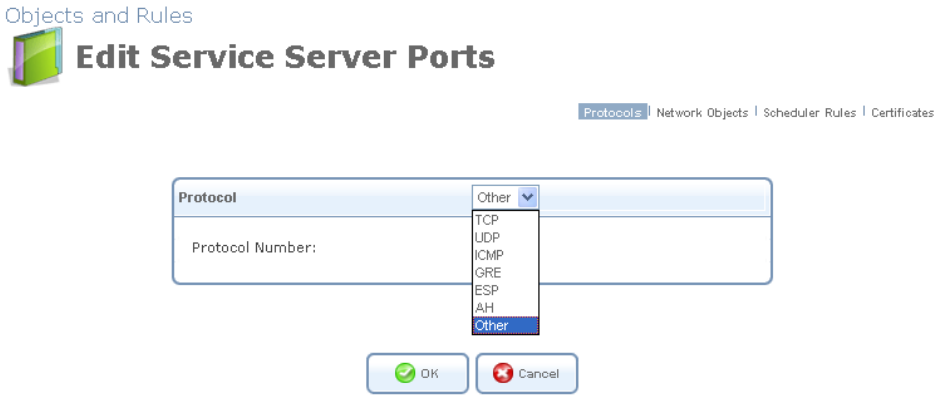


Figure 8.372. Edit Service Server Ports

3. Select a protocol and enter the relevant information.

4. Click 'OK' to save the settings.

8.9.2. Network Objects

Network Objects is a method used to abstractly define a set of LAN hosts, according to specific criteria, such as MAC address, IP address, or host name. Defining such a group can assist when configuring system rules. For example, network objects can be used when configuring OpenRG's security filtering settings such as IP address filtering, host name filtering or MAC address filtering. You can use network objects in order to apply security rules based on host names instead of IP addresses. This may be useful, since IP addresses change from time to time. It is also possible to define network objects according to MAC addresses, making rule application more persistent against network configuration settings. Moreover, OpenRG supports DHCP Option 60, enabling application of security and QoS rules on a network object according to its unique vendor class ID. For example, a Dell OpenRG™ IP telephone can be identified and applied with specific QoS priority rules.
To define a network object:

1. Access this feature either from the 'Objects and Rules' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'Network Objects' screen appears.

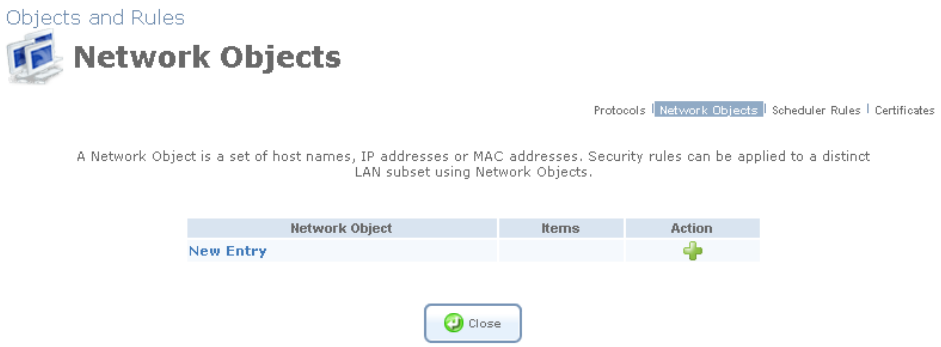

Objects and Rules
Network Objects
Protocols | Network Objects | Scheduler Rules | Certificates
A Network Object is a set of host names, IP addresses or MAC addresses. Security rules can be applied to a distinct LAN subset using Network Objects.
Network Object
Items
Action
New Entry
Close

Figure 8.373. Network Objects

2. Click the 'New Entry' link, the 'Edit Network Object' screen appears.

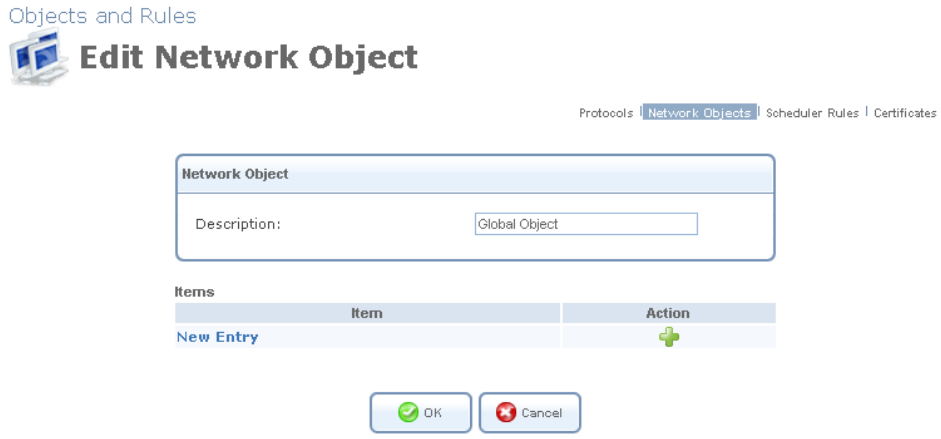


Figure 8.374. Edit Network Object

3. Name the network object in the Description field, and click New Entry to create it. The 'Edit Item' screen appears.

Figure 8.375. Edit Item

When selecting a method from the combo box, the screen refreshes, presenting the respective fields for entering the relevant information. The group definition can be according to one of the following methods:

IP Address Enter an IP address common to the group.

IP Subnet Enter a subnet IP address and a subnet mask.

IP Range Enter first and last IP addresses in the range.

MAC Address Enter a MAC address and mask.

Host Name Enter a host name common to the group.

DHCP Option Enter a vendor class ID if available.

4. Select a method and enter the source address accordingly.
5. Click 'OK' to save the settings.

8.9.3. Scheduler Rules

Scheduler rules are used for limiting the activation of Firewall rules to specific time periods, specified in days of the week, and hours. To define a rule:

1. Access this feature either from the 'Objects and Rules' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'Scheduler Rules' screen appears:

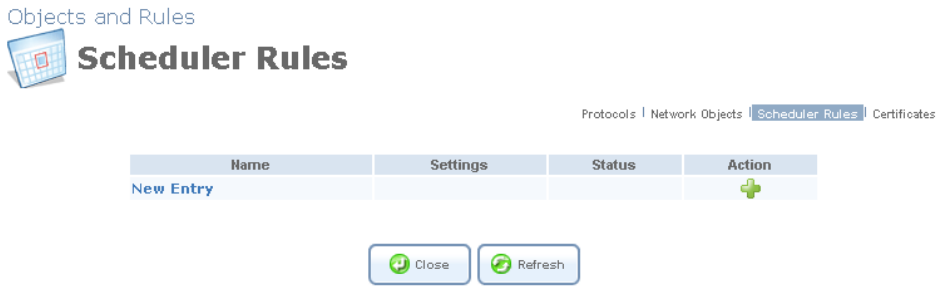


Figure 8.376. Scheduler Rules

2. Click the 'New Entry' link. The 'Edit Scheduler Rule' screen appears:

Figure 8.377. Edit Scheduler Rule

3. Specify a name for the rule in the 'Name' field.
4. Specify if the rule will be active/inactive during the designated time period, by selecting the apporpriate 'Rule Activity Settings' check-box.

5. Click the 'New Time Segment Entry' link to define the time segment to which the rule will apply. The 'Time Segment Edit' screen appears:

Figure 8.378. Time Segment Edit

1. Select active/inactive days of the week.
2. Click the 'New Time Segment Entry' to define an active/inactive hourly range.

6. Click 'OK' to save the settings.

8.9.4. Certificates

8.9.4.1. Overview

Public-key cryptography uses a pair of keys: a public key and a corresponding private key. These keys can play opposite roles, either encrypting or decrypting data. Your public key is made known to the world, while your private key is kept secret. The public and private keys are mathematically associated; however it is computationally infeasible to deduce the private key from the public key. Anyone who has the public key can encrypt information that can only be decrypted with the matching private key. Similarly, the person with the private key can encrypt information that can only be decrypted with the matching public key. Technically, both public and private keys are large numbers that work with cryptographic algorithms to produce encrypted material. The primary benefit of public-key cryptography is that it allows people who have no preexisting security arrangement to authenticate each other and exchange messages securely. OpenRG makes use of public-key cryptography to encrypt and authenticate keys for the encryption of Wireless and VPN data communication, the Web Based Management (WBM) utility, and secured telnet.

8.9.4.1.1. Digital Certificates

When working with public-key cryptography, you should be careful and make sure that you are using the correct person's public key. Man-in-the-middle attacks pose a potential threat, where an ill-intending 3rd party posts a phony key with the name and user ID of an intended recipient. Data transfer that is intercepted by the owner of the counterfeit key can fall in the wrong hands. Digital certificates provide a means for establishing whether a public key truly belongs to the supposed owner. It is a digital form of credential. It has information on it that identifies you, and an authorized statement to the effect that someone else has confirmed your identity. Digital certificates are used to foil attempts by an ill-intending party to use an unauthorized public key. A digital certificate consists of the following:

A public key

Certificate information the "identity" of the user, such as name, user ID and so on.

Digital signatures A statement stating that the information enclosed in the certificate has been vouched for by a Certificate Authority (CA).
Binding this information together, a certificate is a public key with identification forms attached, coupled with a stamp of approval by a trusted party.

8.9.4.1.2. X.509 Certificate Format

OpenRG supports X.509 certificates that comply with the ITU-T X.509 international standard. An X.509 certificate is a collection of a standard set of fields containing information about a user or device and their corresponding public key. The X.509 standard defines what information goes into the certificate, and describes how to encode it (the data format). All X.509 certificates have the following data:

The certificate holder's public key the public key of the certificate holder, together with an algorithm identifier that specifies which cryptosystem the key belongs to and any associated key parameters.

The serial number of the certificate the entity (application or person) that created the certificate is responsible for assigning it a unique serial number to distinguish it from other certificates it issues. This information is used in numerous ways; for example when a certificate is revoked, its serial number is placed on a Certificate Revocation List (CRL).

The certificate holder's unique identifier this name is intended to be unique across the Internet. A DN consists of multiple subsections and may look something like this: CN=John Smith, EMAIL=openrg@jungo.com, OU=R&D, O=Jungo, C=US (These refer to the subject's Common Name, Organizational Unit, Organization, and Country.)

The certificate's validity period the certificate's start date/time and expiration date/time; indicates when the certificate will expire.

The unique name of the certificate issuer the unique name of the entity that signed the certificate. This is normally a CA. Using the certificate implies trusting the entity that signed this certificate. (Note that in some cases, such as root or top-level CA certificates, the issuer signs its own certificate.)

The digital signature of the issuer the signature using the private key of the entity that issued the certificate.

The signature algorithm identifier identifies the algorithm used by the CA to sign the certificate.

8.9.4.2. OpenRG Certificate Stores

OpenRG maintains two certificate stores:

1. OpenRG Local Store This store contains a list of approved certificates that are used to identify OpenRG to its clients. The list also includes certificate requests that are pending a CA's endorsement. You can obtain certificates for OpenRG using the following methods:

   - Requesting an X509 Certificate This method creates both a private and a matching public key. The public key is then sent to the CA to be certified.

   - Creating a Self-Signed Certificate This method is the same as requesting a certificate, only the authentication of the public key does not require a CA. This is mainly intended for use within small organizations.

   - Loading a PKCS#12 Format Certificate This method loads a certificate using an already available and certified set of private and public keys.

2. Certificate Authority (CA) Store This store contains a list of the trusted certificate authorities, which is used to check certificates presented by OpenRG clients.

8.9.4.2.1. Requesting an X509 Certificate

To obtain an X509 certificate, you must ask a CA to issue you one. You provide your public key, proof that you possess the corresponding private key, and some specific information about yourself. You then digitally sign the information and send the whole package -- the certificate request -- to the CA. The CA then performs some due diligence in verifying that the information you provided is correct and, if so, generates the certificate and returns it. You might think of an X509 certificate as looking like a standard paper certificate with a public key taped to it. It has your name and some information about you on it, plus the signature of the person who issued it to you.

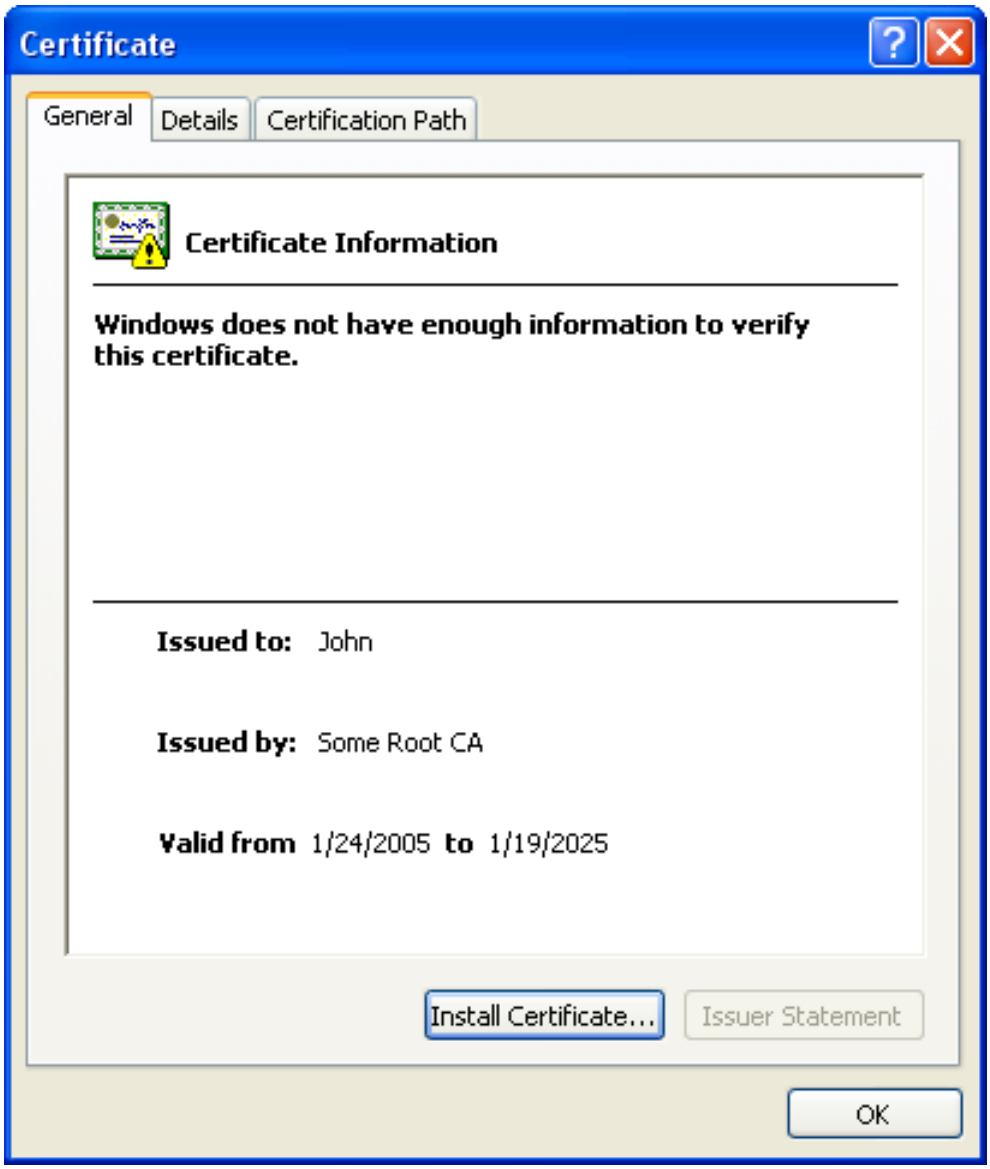


Figure 8.386. Certificate Window

Objects and Rules
Certificate Details
Protocols | Network Objects | Scheduler Rules | Certificates
Owner: OpenRG
Name: Jungo: OpenRG Products Group
Subject: C=US, CN=ORname_Jungo: OpenRG Products Group
Issuer: C=US, CN=ORname_Jungo: OpenRG Products Group
Validity Period:
Not Before: Jun 3 11:11:43 2004 GMT
Not After: May 29 11:11:43 2024 GMT
Close

Figure 8.387. Certificate Details

1. Access this feature either from the 'Objects and Rules' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'Certificates' screen appears.

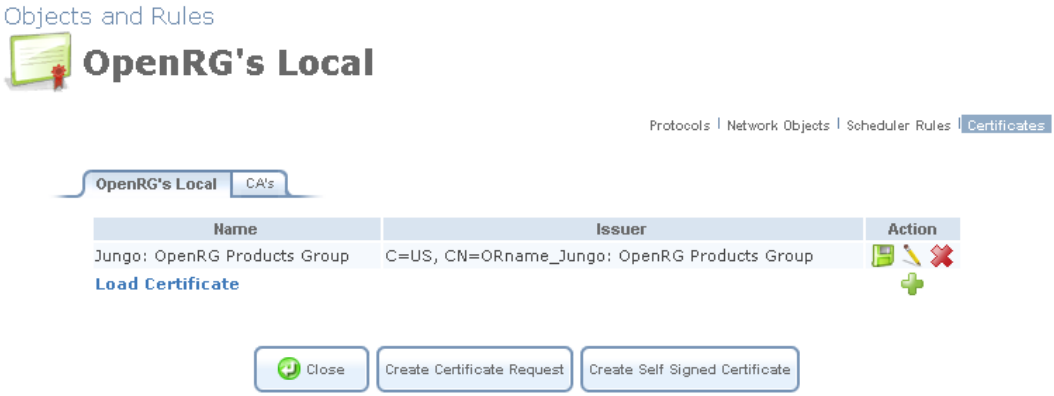


Figure 8.379. Certificate Management

2. Click the 'Create Certificate Request' button. The 'Create X509 Request' screen appears:

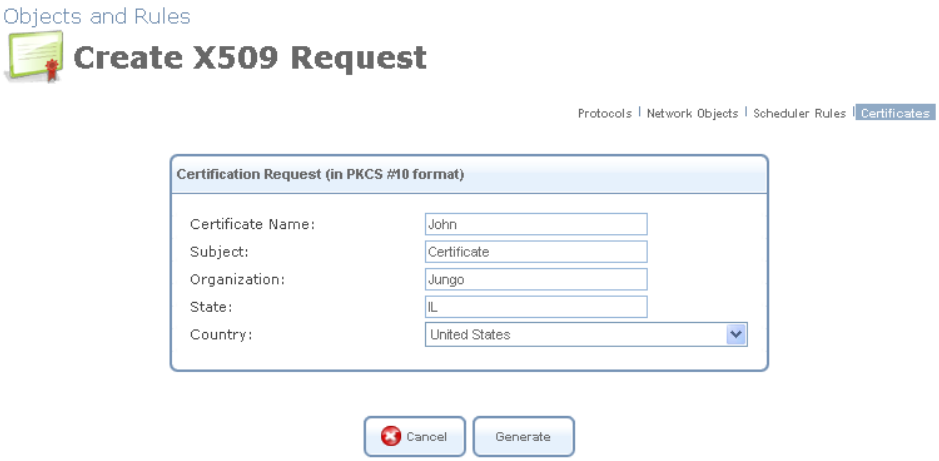


Figure 8.380. Create X509 Request

3. Enter the following certification request parameters:

- Certificate Name
- Subject
- Organization
- State
- Country

4. Click the 'Generate' button. A screen appears, stating that the certification request is being generated (see figure Figure 8.381).

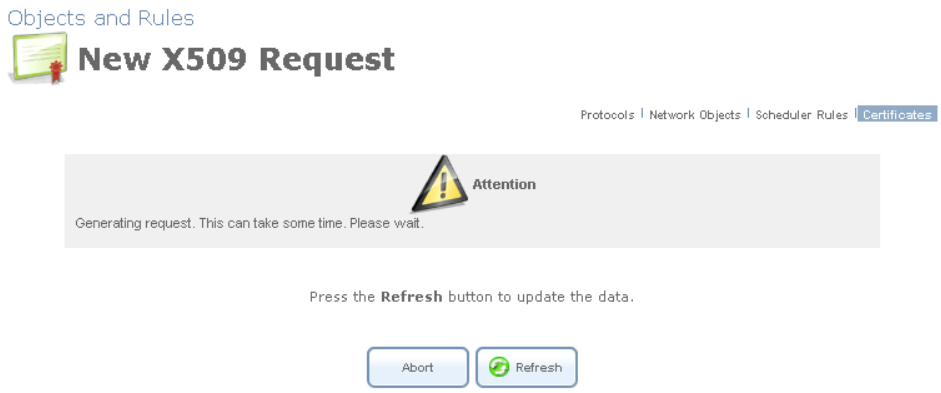

Objects and Rules
New X509 Request
Protocols | Network Objects | Scheduler Rules | Certificates
Attention
Generating request. This can take some time. Please wait.
Press the Refresh button to update the data.
Abort
Refresh

Figure 8.381. Generating a Request

5. After a short while, press the 'Refresh' button, until the 'Save Certificate Request' screen appears:

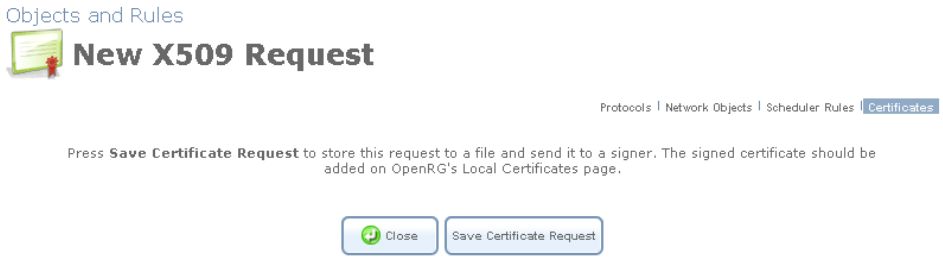

Objects and Rules
New X509 Request
Protocols | Network Objects | Scheduler Rules | Certificates
Press Save Certificate Request to store this request to a file and send it to a signer. The signed certificate should be added on OpenRG's Local Certificates page.
Close
Save Certificate Request

Figure 8.382. Save Certificate Request

6. Click the 'Save Certificate Request' button and save the request to a file.
7. Click the 'Close' button. The main certificate management screen will reappear, listing your certificate as "Unsigned". In this state, the request file may be opened at any time by pressing the action icon and then 'Open' in the dialogue box (Windows only).

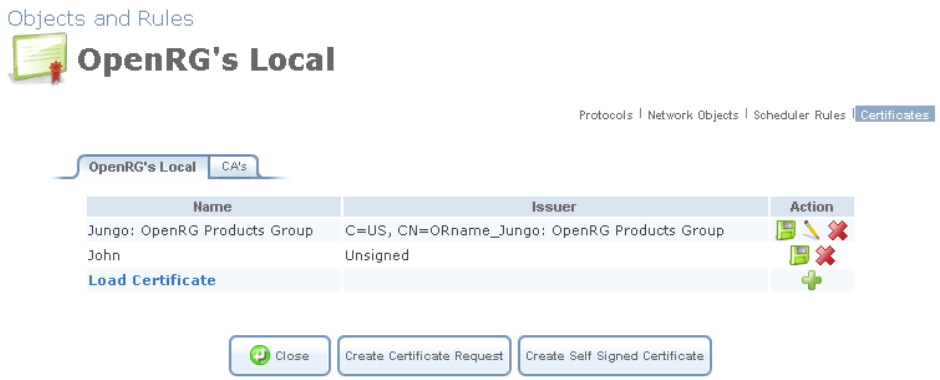


Figure 8.383. Unsigned Certification Request

8. After receiving a reply from the CA in form of a '.pem' file, click the 'Load Certificate' link. The 'Load OpenRG's Local Certificate' screen appears:

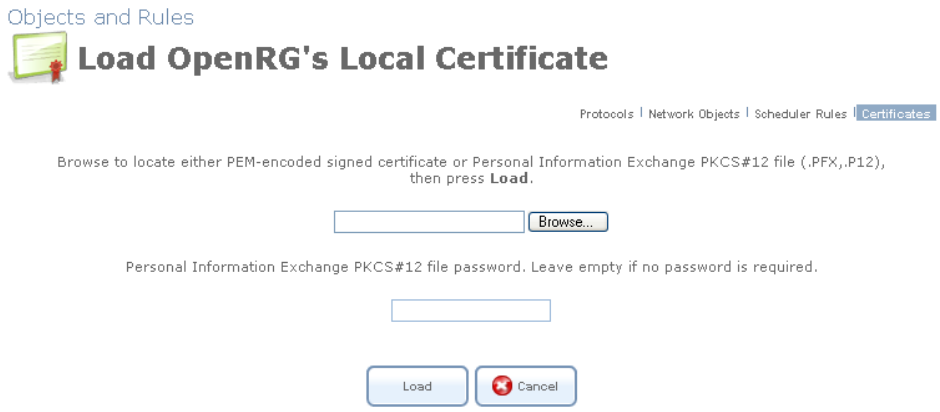

Objects and Rules
Load OpenRG's Local Certificate
Protocols | Network Objects | Scheduler Rules | Certificates
Browse to locate either PEM-encoded signed certificate or Personal Information Exchange PKCS#12 file (.PFX,.P12), then press Load.
Browse...
Personal Information Exchange PKCS#12 file password. Leave empty if no password is required.
Load
Cancel

Figure 8.384. Load Certificate

9. Use the Browse button to browse to the signed certificate '.pem' file. Leave the password entry empty and press "Load" to load the signed certificate. The certificate management screen appears, displaying the certificate name and issuer (see figure Figure 8.385).

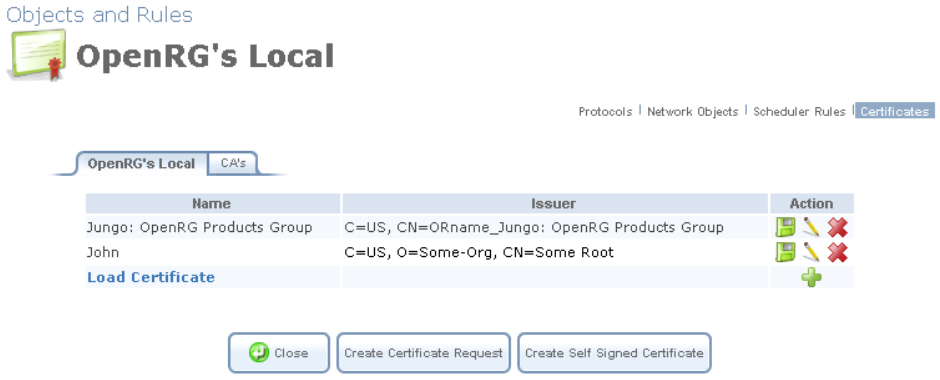


Figure 8.385. Loaded Certificate

10. Click the Save button and then 'Open' in the dialogue box to view the 'Certificate' window (Windows only) (see Figure 8.386). Alternatively, click 'Save' in the dialogue box to save the certificate to a file.

11. You can also click the \editbutton\ to view the 'Certificate Details' screen (see Figure 8.387).

8.9.4.2.2. Creating a Self-Signed Certificate

A default self-signed certificate is included in OpenRG (see figure Figure 7.505), in order to enable certificate demanding services such as HTTPS. Note that if deleted, this certificate is restored when OpenRG's Restore Defaults operation is run (see section Section 8.8.4). To create a self-signed certificate:

1. Access this feature either from the 'Objects and Rules' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'Certificates' screen appears.

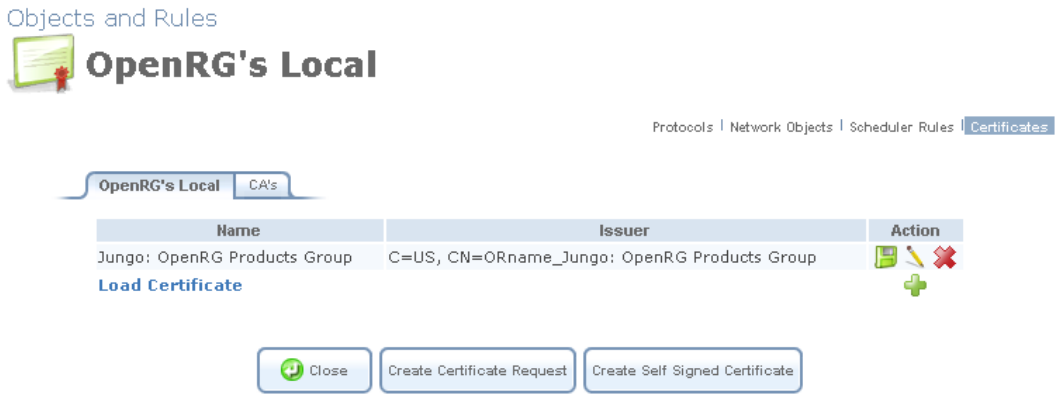


Figure 8.388. Certificate Management

2. Click the 'Create Self Signed Certificate' button. The 'Create Self Signed X509 Certificate' screen appears:

Figure 8.389. Create Self Signed X509 Certificate

3. Enter the following certification request parameters:

   - Certificate Name
   - Subject
   - Organization
   - State
   - Country

4. Click the 'Generate' button. A screen appears, stating that the certificate is being generated (see figure Figure 8.390).

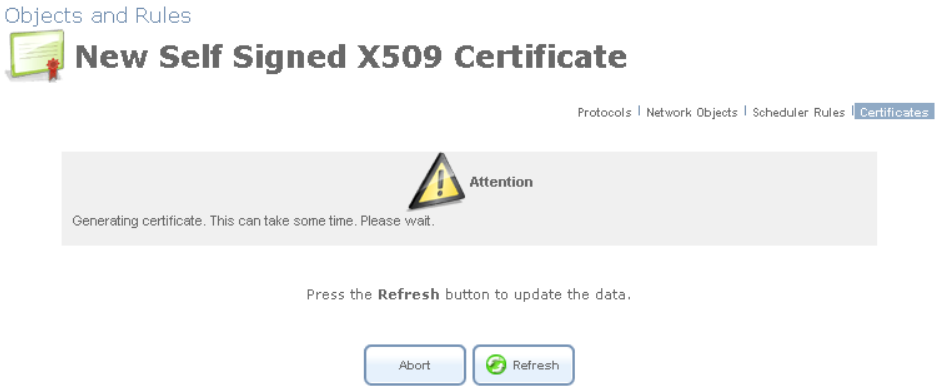

Objects and Rules
New Self Signed X509 Certificate
Protocols | Network Objects | Scheduler Rules | Certificates
Attention
Generating certificate. This can take some time. Please wait.
Press the Refresh button to update the data.
Abort
Refresh

Figure 8.390. Generating Certificate

5. After a short while, press the 'Refresh' button, until the 'Certificate Details' screen appears:

Objects and Rules
Certificate Details
Protocols | Network Objects | Scheduler Rules | Certificates
Owner: OpenRG
Name: Smith
Subject: CN=Self-certificate, O=Jungo, ST=IL, C=US, CN=Smith
Issuer: CN=Self-certificate, O=Jungo, ST=IL, C=US, CN=Smith
Validity Period:
Not Before: Sep 11 16:38:12 2006 GMT
Not After: Sep 6 16:38:12 2026 GMT
Close

Figure 8.391. Certificate Details

6. Click the 'Close' button. The main certificate management screen will reappear, displaying the certificate name and issuer (see figure Figure 8.392).

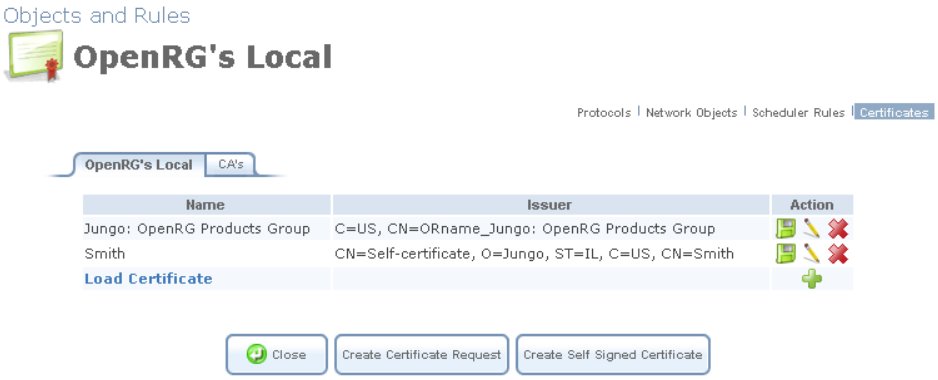


Figure 8.392. Loaded Certificate

7. Click the Save button and then 'Open' in the dialogue box to view the 'Certificate' window (Windows only) (see Figure 8.386). Alternatively, click 'Save' in the dialogue box to save the certificate to a file.

8. You can also click the \editbutton\ to view the 'Certificate Details' screen (see Figure 8.387).

8.9.4.2.3. Loading a PKCS#12 Format Certificate

You can load certificates in PKCS#12 format (usually stored in .p12 files) to OpenRG's certificate store. You must first obtain the '.p12' file, containing the private and public keys and optional CA certificates.

1. Access this feature either from the 'Objects and Rules' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'Certificates' screen appears.

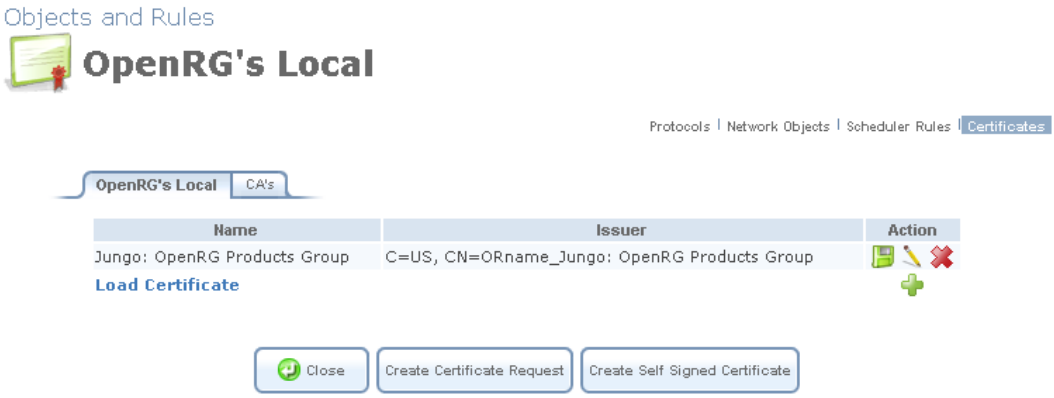


Figure 8.393. Certificate Management

2. Click the 'Load Certificate' link. The 'Load OpenRG's Local Certificate' screen appears:

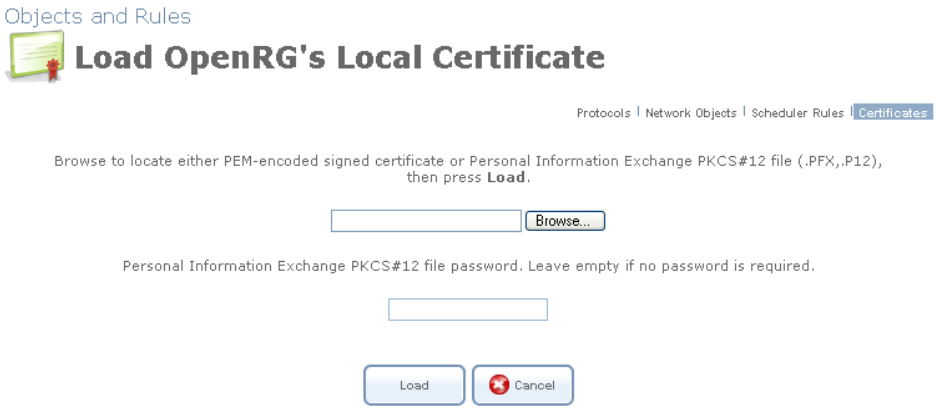

Objects and Rules
Load OpenRG's Local Certificate
Protocols | Network Objects | Scheduler Rules | Certificates
Browse to locate either PEM-encoded signed certificate or Personal Information Exchange PKCS#12 file (.PFX,.P12), then press Load.
Browse...
Personal Information Exchange PKCS#12 file password. Leave empty if no password is required.
Load
Cancel

Figure 8.394. Load Certificate

3. Use the Browse button to browse to the '.p12' file. If the private key is encrypted using a password, type it in the password entry (otherwise leave the entry empty) and press "Load" to load the certificate. The certificate management screen appears, displaying the certificate name and issuer (see figure Figure 8.395). If the '.p12' file contained any CA certificates, they will be displayed in the CA store (click the 'CA's' tab to view the CA certificates).

Figure 8.395. Loaded Certificate

4. Click the Save button and then 'Open' in the dialogue box to view the 'Certificate' window (Windows only) (see Figure 8.386). Alternatively, click 'Save' in the dialogue box to save the certificate to a file.

5. You can also click the \editbutton\ to view the 'Certificate Details' screen (see Figure 8.387).

8.9.4.2.4. Loading a CA's Certificate

Before you can load a CA's certificate, you must obtain a signed certificate '.pem' or '.p12' file.

1. Access this feature either from the 'Objects and Rules' tab under the 'System' screen, or by clicking its icon in the 'Advanced' screen. The 'Certificates' screen appears.

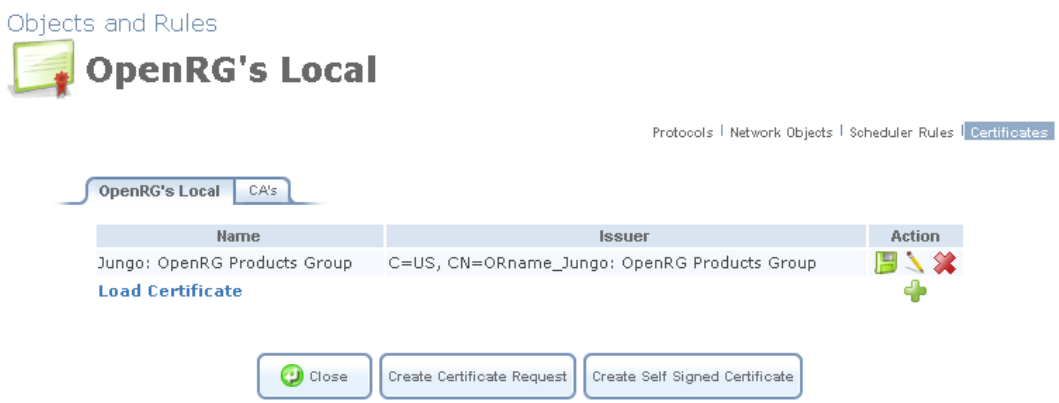


Figure 8.396. Certificate Management

2. Click the 'CA's' certificates tab. The 'CA Certificates' screen will appear (see figure Figure 8.397). This screen displays a list of certificates.

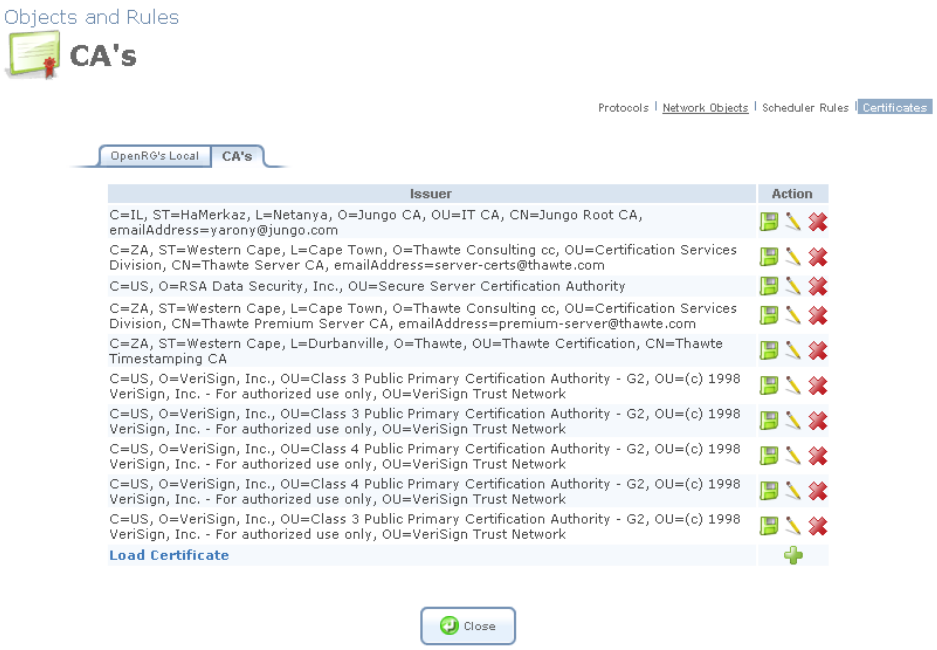

Objects and Rules
CA's
Protocols | Network Objects | Scheduler Rules | Certificates
OpenRG's Local
CA's
Issuer
Action
C=IL, ST=HaMerkaz, L=Netanya, O=Jungo CA, OU=IT CA, CN=Jungo Root CA, emailAddress=yarony@jungo.com
C=ZA, ST=Western Cape, L=Cape Town, O=Thawte Consulting cc, OU=Certification Services Division, CN=Thawte Server CA, emailAddress=server-certs@thawte.com
C=US, O=RSA Data Security, Inc., OU=Secure Server Certification Authority
C=ZA, ST=Western Cape, L=Cape Town, O=Thawte Consulting cc, OU=Certification Services Division, CN=Thawte Premium Server CA, emailAddress=premium-server@thawte.com
C=ZA, ST=Western Cape, L=Durbanville, O=Thawte, OU=Thawte Certification, CN=Thawte Timestamping CA
C=US, O=VeriSign, Inc., OU=Class 3 Public Primary Certification Authority - G2, OU=(c) 1998 VeriSign, Inc. - For authorized use only, OU=VeriSign Trust Network
C=US, O=VeriSign, Inc., OU=Class 3 Public Primary Certification Authority - G2, OU=(c) 1998 VeriSign, Inc. - For authorized use only, OU=VeriSign Trust Network
C=US, O=VeriSign, Inc., OU=Class 4 Public Primary Certification Authority - G2, OU=(c) 1998 VeriSign, Inc. - For authorized use only, OU=VeriSign Trust Network
C=US, O=VeriSign, Inc., OU=Class 4 Public Primary Certification Authority - G2, OU=(c) 1998 VeriSign, Inc. - For authorized use only, OU=VeriSign Trust Network
C=US, O=VeriSign, Inc., OU=Class 3 Public Primary Certification Authority - G2, OU=(c) 1998 VeriSign, Inc. - For authorized use only, OU=VeriSign Trust Network
Load Certificate
Close

Figure 8.397. CA's Certificates

3. Click the 'Load Certificate' link. The 'Load CA's Certificate' screen appears:

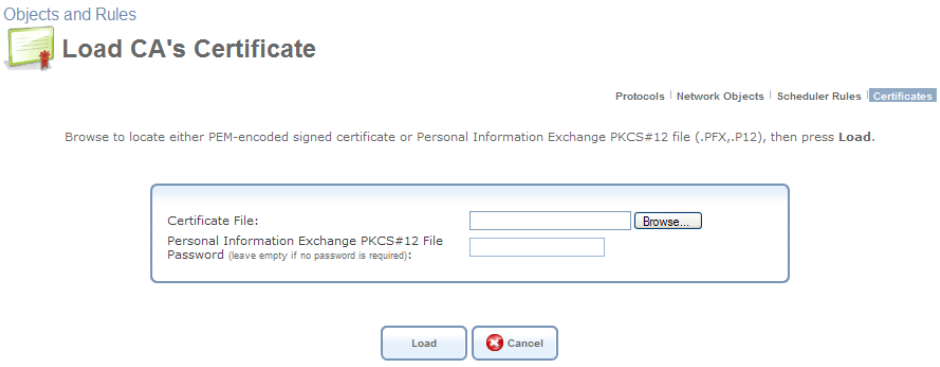

Objects and Rules
Load CA's Certificate
Protocols | Network Objects | Scheduler Rules | Certificates
Browse to locate either PEM-encoded signed certificate or Personal Information Exchange PKCS#12 file (.PFX,.P12), then press Load.
Certificate File:
Browse...
Personal Information Exchange PKCS#12 File Password (leave empty if no password is required):
Load
Cancel

Figure 8.398. Load CA's Certificate

4. Use the Browse button to browse to the '.pem' or '.p12' file. Leave the password entry empty and press "Load" to load the certificate. The CA Certificates screen will reappear (see figure Figure 8.397), displaying the trusted certificate authority at the bottom of the list.

5. Click the Save button and then 'Open' in the dialogue box to view the 'Certificate' window (Windows only) (see Figure 8.386). Alternatively, click 'Save' in the dialogue box to save the certificate to a file.

6. You can also click the \editbutton\ to view the 'Certificate Details' screen (see Figure 8.387).

9

Advanced

This section of the Web-based Management offers shortcuts to OpenRG's more advanced features. The different icons redirect to their respective screens, described throughout this manual. Please note that changes to advanced settings may adversely affect the operation of OpenRG and your home network, and should be made with caution.

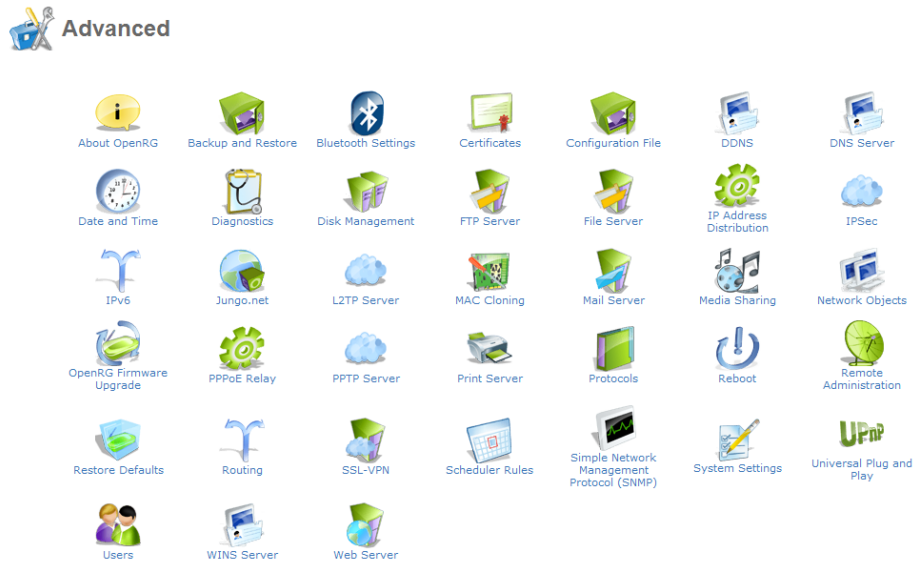


Figure 9.1. Advanced

This screen enables you to configure the following features:

About OpenRG – View various details about OpenRG's software version, such as version number, type of platform and list of features. This icon redirects to the 'Maintenance' tab under 'System' (refer to Section 8.8.1).

Backup and Restore – Backup user and system data. This icon redirects to the 'Storage' tab under 'Services' (refer to Section 7.11.6).

Bluetooth Settings – Allow devices to connect to OpenRG's LAN via Bluetooth. This icon redirects to the 'Advanced' tab under 'Services' (refer to Section 7.13.3).

Certificates – Manage digital certificates. This icon redirects to the 'Objects and Rules' tab under 'System' (refer to Section 8.9.4).

Configuration File – View, save and load the configuration file. This icon redirects to the 'Maintenance' tab under 'System' (refer to Section 8.8.2).

DNS Server – View and modify the DNS hosts table. This icon redirects to the 'Advanced' tab under 'Services' (refer to Section 7.13.1).

Date and Time – Set the local date and time. This icon redirects to the 'Settings' tab under 'System' (refer to Section 8.2.2).

Diagnostics – Perform networking diagnostics. This icon redirects to the 'Maintenance' tab under 'System' (refer to Section 8.8.7).

Disk Management – Manage different disks connected to your gateway. This icon redirects to the 'Shared Storage' tab under 'Local Network' (refer to Section 6.4).

FTP Server – Provide file exchanging capabilities. This icon redirects to the 'Storage' tab under 'Services' (refer to Section 7.11.1).

File Server – Turn your gateway into a file server. This icon redirects to the 'Storage' tab under 'Services' (refer to Section 7.11.2).

IP Address Distribution – Modify the behavior of the DHCP server for each LAN device and view a list of DHCP clients in the local network. This icon redirects to the 'Advanced' tab under 'Services' (refer to Section 7.13.2).

IPSec – Configure Internet protocol security parameters. This icon redirects to the 'VPN' tab under 'Services' (refer to Section 7.10.1).

IPv6 – Configure IPv6-over-IPv4 tunneling. This icon redirects to the 'Routing' tab under 'System' (refer to Section 8.6.2).

Jungo.net – use Jungo.net services. This icon redirects to the 'Jungo.net' tab under 'Services (refer to Section 7.2).

L2TP Server – Configure Layer 2 tunneling protocol parameters. This icon redirects to the 'VPN' tab under 'Services' (refer to Section 7.10.4).

MAC Cloning – Clone your PC's MAC address. This icon redirects to the 'Maintenance' tab under 'System' (refer to Section 8.8.6).

Mail Server – Provide mail services for LAN and WAN users. This icon redirects to the 'Storage' tab under 'Services' (refer to Section 7.11.5).

Media Sharing – Share and stream media files saved on a storage device connected to OpenRG. This icon redirects to the 'Media Sharing' tab under 'Services' (refer to Section 7.5).

Network Objects – Define groups of LAN devices for system rules. This icon redirects to the 'Objects and Rules' tab under 'System' (refer to Section 8.9.2).

OpenRG Firmware Upgrade – Upgrade OpenRG's software image. This icon redirects to the 'Maintenance' tab under 'System' (refer to Section 8.8.5).

PPPoE Relay – Enable PPPoE relay on OpenRG. This icon redirects to the 'Routing' tab under 'System' (refer to Section 8.6.4).

PPTP Server – Configure point-to-point tunneling protocol parameters. This icon redirects to the 'VPN' tab under 'Services' (refer to Section 7.10.3).

Personal Domain Name (Dynamic DNS) – Alias a dynamic IP address to a static hostname. This icon redirects to the 'DDNS' tab under 'Services' (refer to Section 7.12).

Print Server – Share a LAN printer. This icon redirects to the 'Shared Printer' tab under 'Local Network' (refer to Section 6.5).

Protocols – View and edit OpenRG's list of supported protocols. This icon redirects to the 'Objects and Rules' tab under 'System' (refer to Section 8.9.1).

Reboot – Reboot OpenRG. This icon redirects to the 'Maintenance' tab under 'System' (refer to Section 8.8.3).

Remote Administration – Configure remote administration privileges. This icon redirects to the 'Management' tab under 'System' (refer to Section 8.7.3).

Restore Defaults – Restore default factory settings. This icon redirects to the 'Maintenance' tab under 'System' (refer to Section 8.8.4).

Routing – Manage routing policies. This icon redirects to the 'Routing' tab under 'System' (refer to Section 8.6.1).

SSL VPN – Create a zero-configuration remote connection to OpenRG. This icon redirects to the 'SSL-VPN' tab under 'Services' (refer to Section 7.10.2).

Scheduler Rules – Define time segments for system rules. This icon redirects to the 'Objects and Rules' tab under 'System' (refer to Section 8.9.3).

SNMP Protocol – Configure OpenRG's SNMP agent. This icon redirects to the 'Management' tab under 'System' (refer to Section 8.7.2).

System Settings – Modify administrator settings, including OpenRG's hostname. This icon redirects to the 'Settings' tab under 'System' (refer to Section 8.2).

Universal Plug and Play – Configure UPnP parameters. This icon redirects to the 'Management' tab under 'System' (refer to Section 8.7.1).

Users – Configure OpenRG's users and their permissions. This icon redirects to the 'Users' tab under 'System' (refer to Section 8.3).

WINS Server – Register host names and IP addresses of WINS clients. This icon redirects to the 'Storage' tab under 'Services' (refer to Section 7.11.3).

Web Server – Host a Web site on your gateway. This icon redirects to the 'Storage' tab under 'Services' (refer to Section 7.11.4).

RADIUS Server – Authenticate wireless clients with a RADIUS server (refer to Section 7.13.4).

Part III. Additional Features

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10

Zero Configuration Technology

Zero Configuration Technology is a communication architecture that automates different procedures on OpenRG, omitting the need for complex user configuration. This technology is an extension of OpenRG's Universal Plug-and-Play support for seamless compatibility between networking equipment, software and peripherals (see section Section 8.7.1). OpenRG's zero configuration technology consists mainly of the following technologies:

- IP auto-detection
- Automatic configuration for non-Plug-and-Play networks
- Network map builder

10.1. IP Auto-detection

This module enables the gateway to identify manually pre-configured static IP devices, in addition to its DHCP clients. The DHCP server dynamically assigns IP addresses to DHCP clients that are connected to the network, from a pool of IP addresses. By automatically doing so, it eliminates the home user's need to configure the LAN PC with a complicated IP address, accompanied with additional settings such as network mask and default gateway. However, many users still use manually pre-configured static IP addresses, and generally gateways do not have information regarding such static IP addresses used by the different LAN PCs. The IP auto-detection method detects and learns all the IP addresses on the LAN, and integrates the collected information with the available database of the DHCP server. This allows the DHCP server to issue valid leases, thus avoiding conflicting IP addresses used by other computers in the network. OpenRG's IP auto detection achieves a complete coverage of the network IP addresses. The gateway sends a set of requests on the network periodically, and collects the replies. Unknown IP addresses are added to the DHCP list and excluded from the pool of addresses for allocation.

10.2. Automatic Configuration for Non-Plug-and-Play Networks

The automatic configuration for non-Plug-and-Play networks enables any device on the LAN to immediately connect to the WAN, regardless of its current configuration. Computers in your network may carry preset configurations of non-plug-and-play networks. For example, mobile PCs that are statically configured to work in the office but not at home. In order to connect to a residential gateway at home, these computers must be

reconfigured. A standard residential gateway is unable to establish data connection with such device, unless the user adjusts the computer configuration to meet the gateway's pre-configured parameters. OpenRG's automatic configuration technology is capable of understanding the non-Plug-and-Play network topology, and adjusts itself according to the learned parameters. That is, instead of the user having to reconfigure the computer, OpenRG auto-configures the relevant parameters, enabling the computer to connect to the network and to the Web.

10.3. Network Map Builder

The network map builder provides an up to date accurate graphical representation of the LAN network, displaying the devices currently connected to the gateway and their parameters. While the standard network map displays devices with a DHCP lease from OpenRG, with zero configuration technology devices with statically-defined IP addresses are also displayed. The network map builder relies on existing modules, such as the DHCP and the IP auto detection, as well as its own information collectors to assemble the network information. All information is validated and displayed in the network map. The network map builder actively sends various messages to discover which network objects are currently active on the network. Comparing the replies to its list of IP addresses or host names, OpenRG is updated with information on the network view. This data is then validated and translated to a user friendly, graphic map. For more information about the network map, refer to section Section 4.2.

11

Reducing Support Calls

OpenRG's Web-based Management is engineered to be easy to use, intuitive and friendly. In addition to this concept, the WBM implements several features aimed at troubleshooting user difficulties at real time, thus reducing the likelihood of potential support inquiries. These features are dispersed within the WBM at their relevant locations; however they are also described in this chapter in a list form.

11.1. Connection Problem Interception Page

There may be cases where Internet connection problems will prevent you from surfing. In such cases, OpenRG will intercept the browsing attempt and display the following screen, instead of the browser's standard 'Error 404: The page cannot be displayed' page.

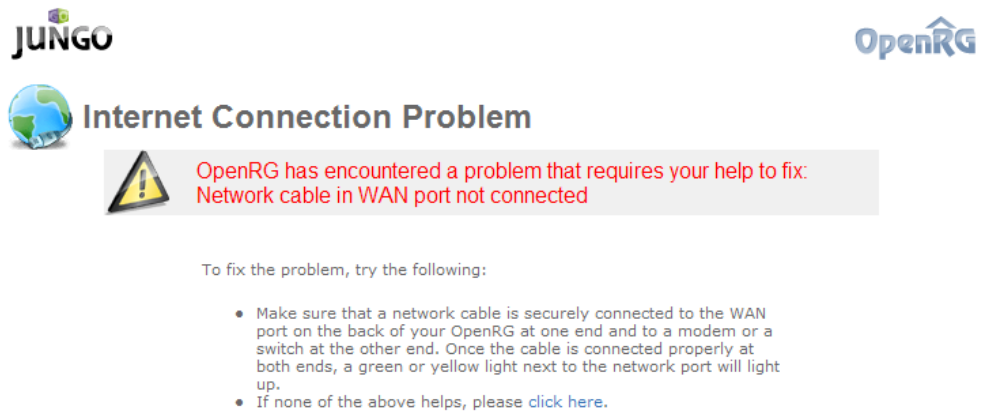
JUNGO
OpenRG
Internet Connection Problem
OpenRG has encountered a problem that requires your help to fix:
Network cable in WAN port not connected
To fix the problem, try the following:
Make sure that a network cable is securely connected to the WAN port on the back of your OpenRG at one end and to a modem or a switch at the other end. Once the cable is connected properly at both ends, a green or yellow light next to the network port will light up.
If none of the above helps, please click here.

Figure 11.1. Internet Connection Problem

This page informs not only of the problem, but also of its possible reasons, and even provides troubleshooting options. In this example, the cause for the problem is that the WAN port network cable is not connected. If reconnecting the cable does not resolve the problem, this screen provides an additional link for further advice. Click the 'click here' link. The following screen appears.

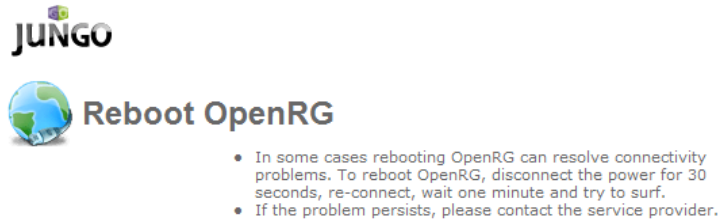
JUNGO
OpenRG
Reboot OpenRG
In some cases rebooting OpenRG can resolve connectivity problems. To reboot OpenRG, disconnect the power for 30 seconds, re-connect, wait one minute and try to surf.
If the problem persists, please contact the service provider.

Figure 11.2. Reboot OpenRG

Rebooting OpenRG is another measure you can take in attempt to restore your Internet connection. As evident, this feature is much more interactive and informative than the browser's standard 'Error 404' page.

11.2. Forgotten Password for Wireless Network

When attempting to connect to OpenRG as a wireless client, you are prompted to enter a username and password. In case you have forgotten your password, use the 'Forgot Your Password?' link that appears in the login screen.

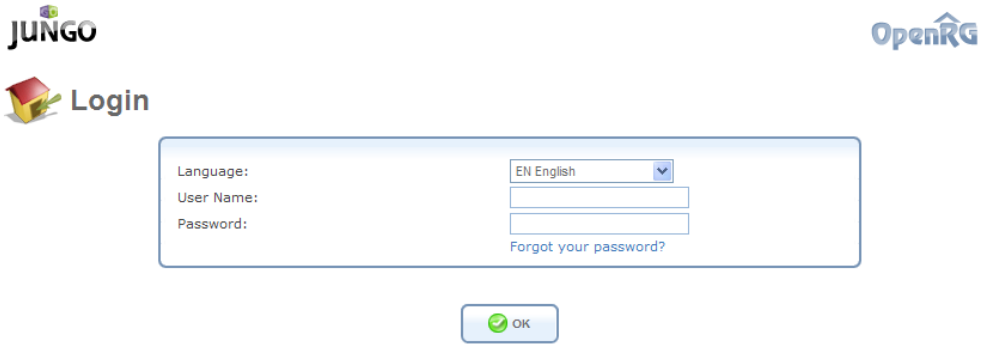

Figure 11.3. Wireless Login

The 'Forgotten Password for Wireless Network' screen appears, providing numerous possible courses of action aimed at helping you login.

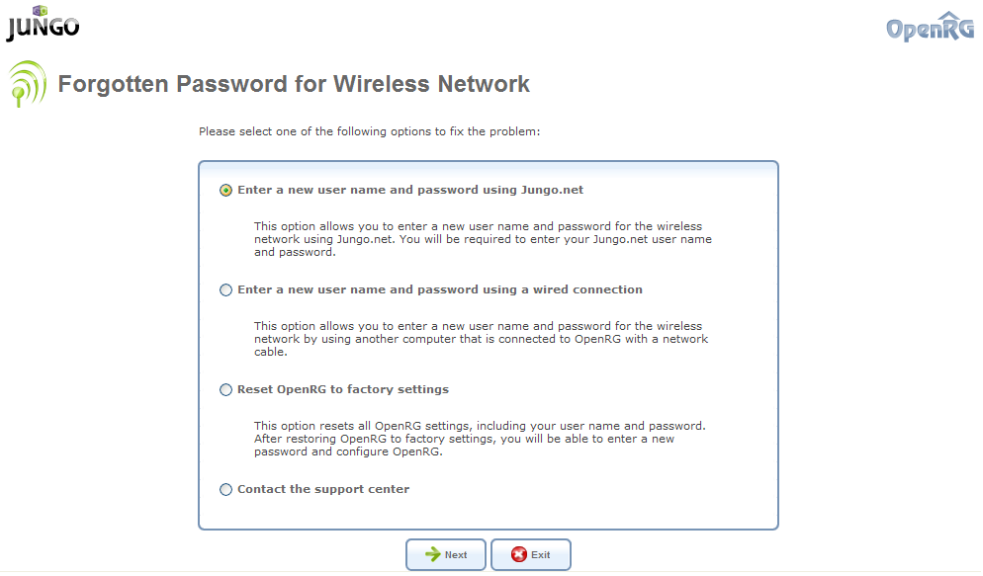
JUNGO
OpenRG
Forgotten Password for Wireless Network
Please select one of the following options to fix the problem:
Enter a new user name and password using Jungo.net
This option allows you to enter a new user name and password for the wireless network using Jungo.net. You will be required to enter your Jungo.net user name and password.
Enter a new user name and password using a wired connection
This option allows you to enter a new user name and password for the wireless network by using another computer that is connected to OpenRG with a network cable.
Reset OpenRG to factory settings
This option resets all OpenRG settings, including your user name and password. After restoring OpenRG to factory settings, you will be able to enter a new password and configure OpenRG.
Contact the support center
Next
Exit

Figure 11.4. Forgotten Password for Wireless Network

- **Enter a new user name and password using Jungo.net** This option appears only when OpenRG is connected to Jungo.net. It enables you to enter a new user name and password for the wireless network using Jungo.net.

  1. To use this option, select its radio button and click 'Next'. The Jungo.net login screen appears.

Figure 11.5. Jungo.net Login

  2. Enter OpenRG's Jungo.net user name and password, and click 'OK'. The 'Wireless LAN User' screen appears.

Figure 11.6. Wireless LAN User

  3. Create a new wireless client by entering a user name and password, and click 'Go'. The screen refreshes as the user is created, until the 'New User Created' screen appears.

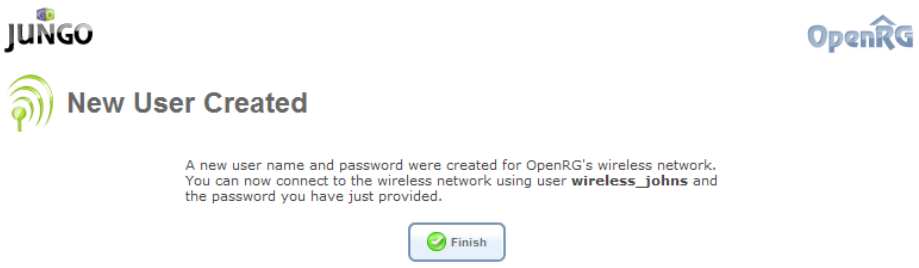
JUNGO
OpenRG
New User Created
A new user name and password were created for OpenRG's wireless network.
You can now connect to the wireless network using user wireless_johns and the password you have just provided.
Finish

Figure 11.7. New User Created

  4. Click 'Finish'. OpenRG's login screen appears. You can now login with the new wireless client details.

- **Enter a new user name and password using a wired connection** This option allows you to enter a new user name and password for the wireless network by using another computer that is physically connected to OpenRG. To use this option, select its radio button and click 'Next'. The next screen contains a detailed description of the steps you must follow in order to create a new user name and password for the wireless network.

JUNGO
OpenRG
Enter a New User Name and Password Using a Wired Connection
To add a new user name and password:
1. Go to a computer that is connected to OpenRG using a network cable.
2. Open a web browser.
3. In the address bar, type http://openrg.home.
4. Click Forgot your wireless network password?.
Back
Exit

Figure 11.8. Enter a New User Name and Password Using a Wired Connection

- **Reset OpenRG to factory settings** This option resets OpenRG's settings, including your user name and password. To use this option, select its radio button and click 'Next'. The next screen contains a detailed description of the steps you must follow in order to reset OpenRG to its factory settings.

JUNGO
OpenRG
Reset Factory Settings
To reset OpenRG to factory settings:
1. Push and hold the reset button for 5 seconds.
2. OpenRG will restore to factory settings and reboot.
3. After reboot is complete, OpenRG's network name (SSID) will change to openrg, set your computer to connect to this network.
4. Type http://openrg.home in the web browser address bar.
5. Follow the Installation Wizard.
Back
Exit

Figure 11.9. Reset Factory Settings

- **Contact the support center** If all previous methods have not been helpful, select this radio button and click 'Next'. The next screen contains instructions to call the support center, and displays your gateway's identification required when opening a support call.

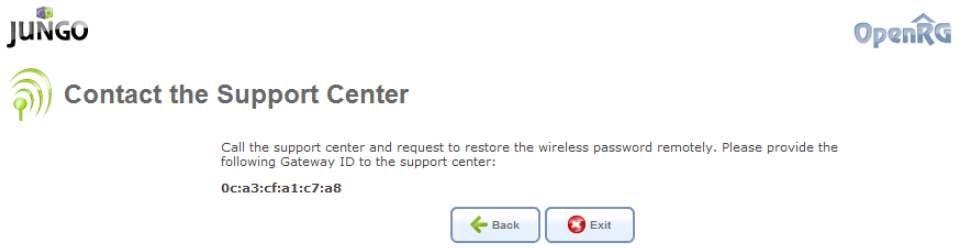
JUNGO
OpenRG
Contact the Support Center
Call the support center and request to restore the wireless password remotely. Please provide the following Gateway ID to the support center:
0c:a3:cf:a1:c7:a8
Back
Exit

Figure 11.10. Contact the Support Center

11.3. Configuration Backup

OpenRG's configuration file (**rg_conf**) contains all the entries that determine how OpenRG is configured. This file is updated with every configuration change made to OpenRG. If, for any reason, OpenRG must be restored to a previous state, other than the factory default settings, it is possible to do so with a saved configuration file. For this purpose, when OpenRG connects to Jungo.net, its configuration file is saved on the server. The file is saved again every 24 hours thereafter. You can restore OpenRG to a previous configuration using such a saved configuration file.
To restore a configuration file saved on the Jungo.net server, perform the following:

1. Browse to Jungo.net. The 'Welcome to Jungo.net' screen appears.

Welcome to Jungo.net
Welcome
Jungo.net is your personal portal for registering for powerful new services for your home or business
Jungo.net Services
Establish a web presence with your own personal Internet address
Access/share your PC files from anywhere/with anyone
Have your personal Web Site
Observe and control your home or office via the Internet
News
19-Nov-06 - Online Anti-Virus Service Is Available
19-Nov-06 - Video-on-Demand Service Is Released Soon

Figure 11.11. Welcome to Jungo.net

2. Click the 'Login' link at the the top right corner. The 'Login' screen appears.

Figure 11.12. Jungo.net Login

3. Enter your username and password, and click 'OK'.

4. Under the 'Account' tab, click the 'Settings' link, and then click the 'System Restore' sub-link. The 'System Restore' screen appears.

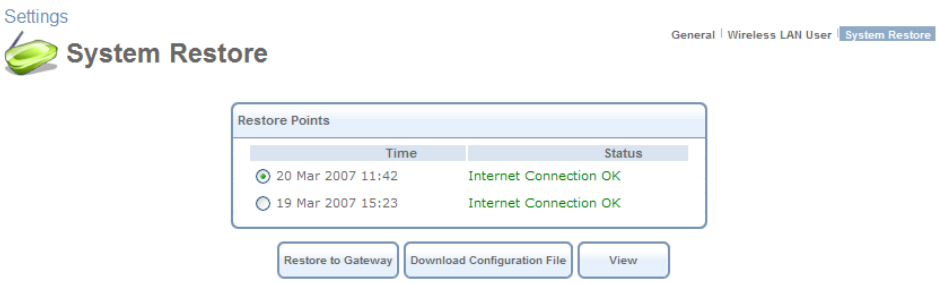

Figure 11.13. System Restore

This screen displays the configuration files time of saving. Each entry can be used as restoration point.

5. Select a restoration point and click one of the following buttons:

   - **Restore to Gateway**

1. Use this option to restore OpenRG's settings with this configuration file. The following warning appears.

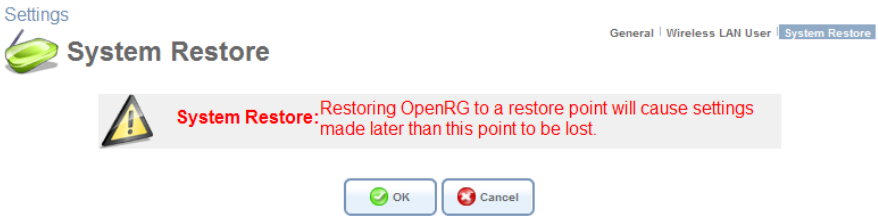
Settings
System Restore
General | Wireless LAN User | System Restore
System Restore: Restoring OpenRG to a restore point will cause settings made later than this point to be lost.
OK
Cancel

Figure 11.14. System Restore Warning

2. Click 'OK' to proceed. The screen refreshes as the file is loaded, until the 'A new configuration file was successfully uploaded to gateway' message appears.

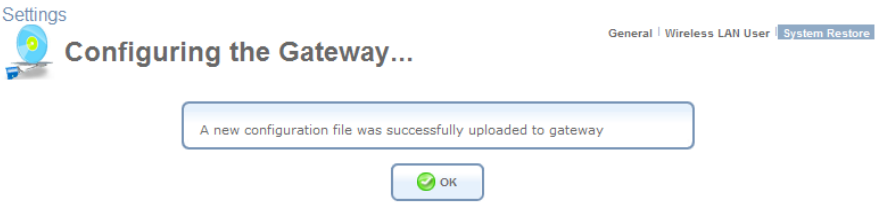
Settings
Configuring the Gateway...
General | Wireless LAN User | System Restore
A new configuration file was successfully uploaded to gateway
OK

Figure 11.15. Configuration File Uploaded Successfully

- **Download Configuration File** Use this option to download the configuration file to disk. A standard file download dialogue window appears. Select 'Save' and choose a location for saving the **OpenRG.conf** file.

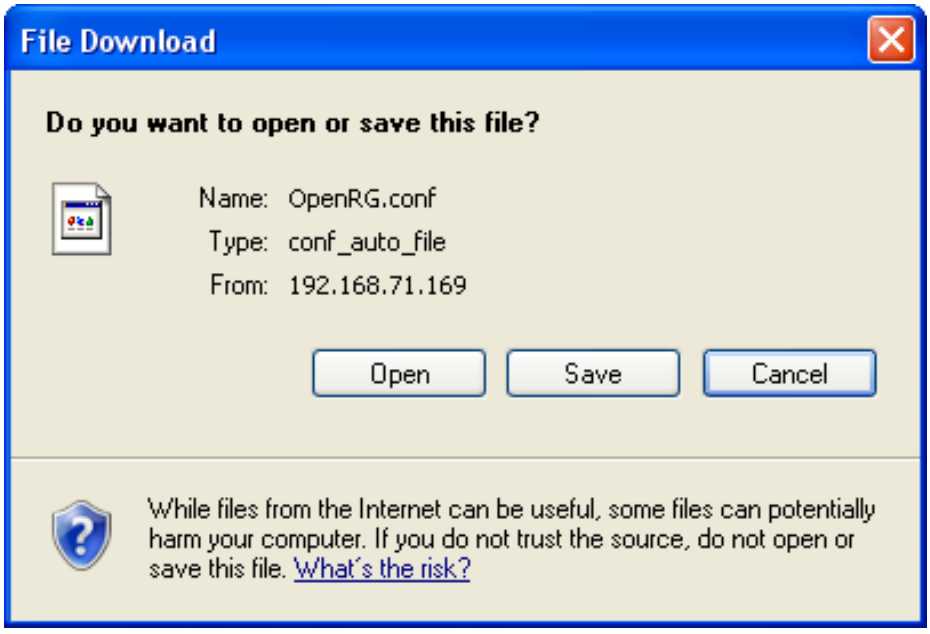
File Download
Do you want to open or save this file?
Name: OpenRG.conf
Type: conf_auto_file
From: 192.168.71.169
Open
Save
Cancel
While files from the Internet can be useful, some files can potentially harm your computer. If you do not trust the source, do not open or save this file. What's the risk?

Figure 11.16. Windows Download Dialogue

- **View** Use this option to view the configuration file's contents. The 'Configuration File' screen appears.

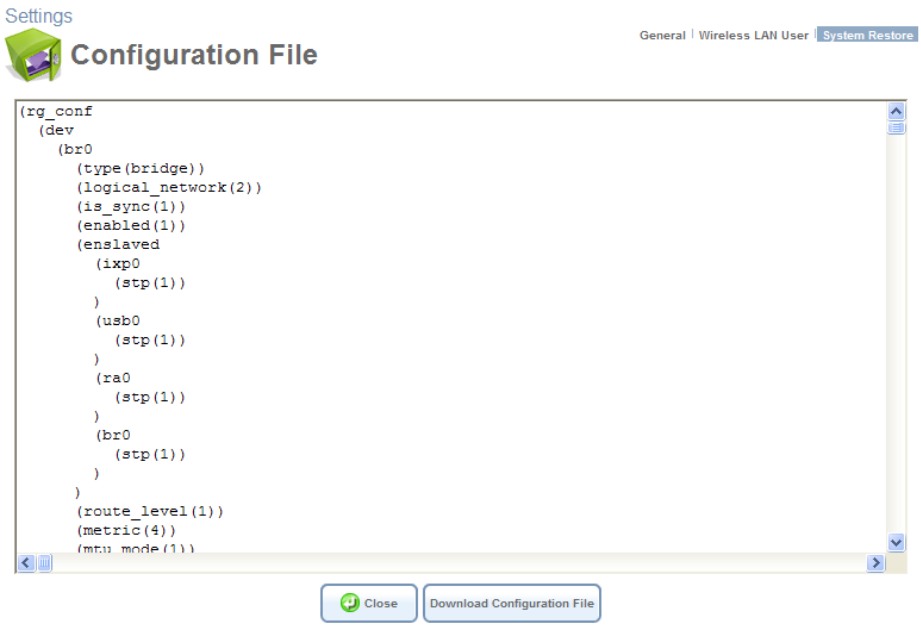

Figure 11.17. Configuration File

11.4. Top Bandwidth Consumers

Amongst its diverse information, OpenRG's homepage displays your Internet connection status, and specifically the top bandwidth consuming applications and computers.

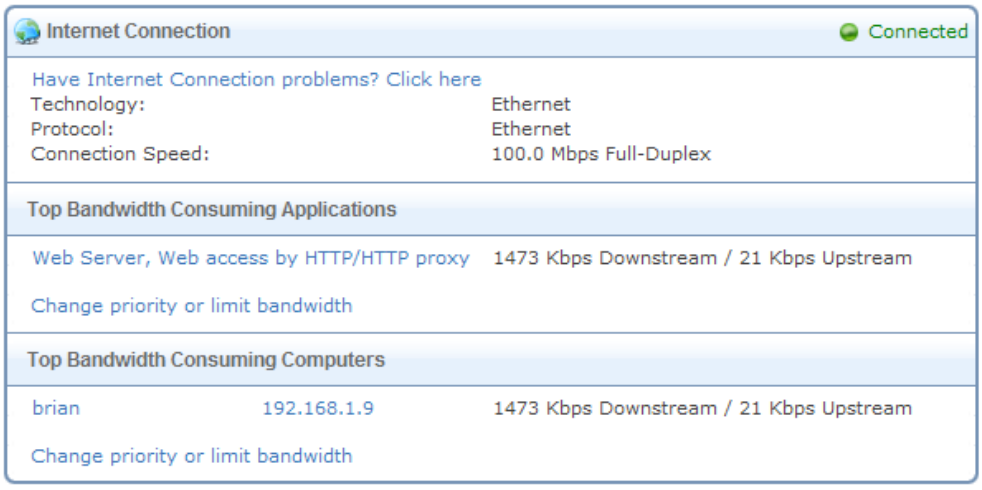
Internet Connection
Connected
Have Internet Connection problems? Click here
Technology: Ethernet
Protocol: Ethernet
Connection Speed: 100.0 Mbps Full-Duplex
Top Bandwidth Consuming Applications
Web Server, Web access by HTTP/HTTP proxy 1473 Kbps Downstream / 21 Kbps Upstream
Change priority or limit bandwidth
Top Bandwidth Consuming Computers
brian 192.168.1.9 1473 Kbps Downstream / 21 Kbps Upstream
Change priority or limit bandwidth

Figure 11.18. Internet Connection and Top Bandwidth Consumers

The top five bandwidth consuming applications and computers are displayed in their respective sections in descending order. The current downstream and upstream volumes are also displayed for every application and computer. The following links are available:

- **Have Internet Connection problems? Click here** This link routes you to the 'Diagnostics' screen under the 'Internet Connection' tab, where you can run tests in order to diagnose and resolve Internet connectivity problems (for more information, refer to section Section 5.4).

- **Top Bandwidth Consuming Applications** This headline link is identical to the 'Change priority or limit bandwidth' link inside this section. It routes to the 'Internet Connection Utilization' screen under 'QoS' in the

'Services' tab, and provides 'By Application' view. This section also displays the specific bandwidth consuming applications, which you can click to view their details (for more information, refer to section Section 7.4.2.1).

- **Top Bandwidth Consuming Computers** This headline link is identical to the 'Change priority or limit bandwidth' link inside this section. It routes to the 'Internet Connection Utilization' screen under 'QoS' in the 'Services' tab, and provides 'By Computer' view. This section also displays the specific bandwidth consuming computers, which you can click to view their details (for more information, refer to section Section 7.4.2.2).

Part IV. Appendix

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12

List of Acronyms

ALG	Application-Level Gateway
API	Application Programming Interface
CPE	Customer Premise Equipment
DHCP	Dynamic Host Configuration Protocol
DMZ	Demilitarized Zone
DNS	Domain Name System
DOCSIS	Data Over Cable Service Interface Specification
DSL	Digital Subscriber Line
FTP	File Transfer Protocol
HomePNA	Home Phoneline Network Alliance
HTTP	HyperText Transport Protocol
IAD	Integrated Access Device
ICMP	Internet Control Message Protocol
IGMP	Internet Group Multicast Protocol
IP	Internet Protocol
IPSec	IP Security
LAN	Local Area Network
MAC	Media Access Control
MTU	Maximum Transmission Unit
NAPT	Network Address Port Translation
OAM	Operations and Maintenance
OEM	Original Equipment Manufacturer
PDA	Personal Digital Assistant
POP3	Post Office Protocol 3
PPP	Point-to-Point Protocol
PPTP	Point-to-Point Tunneling Protocol

RG	Residential Gateway
RIP	Routing Information Protocol
SNMP	Simple Network Management Protocol
SPI	Stateful Packet Inspection
TCP	Transmission Control Protocol
TFTP	Trivial File Transfer Protocol
UDP	User Datagram Protocol
UPnP	Universal Plug and Play
URL	Universal Resource Locator
USB	Universal Serial Bus
VPN	Virtual Private Network
WAN	Wide Area Network

13

Glossary

PAP Password Authentication Protocol, the most basic form of authentication, in which a user's name and password are transmitted over a network and compared to a table of name-password pairs. Typically, the passwords stored in the table are encrypted. The Basic Authentication feature built into the HTTP protocol uses PAP.

CHAP Challenge Handshake Authentication Protocol, a type of authentication in which the authentication agent (typically a network server) sends the client program a random value that is used only once and an ID value. The sender and peer must share a predefined secret.

Authentication The process of identifying an individual, usually based on a username and password. In security systems, authentication is distinct from authorization, which is the process of giving individuals access to system objects based on their identity. Authentication merely ensures that the individual is who he or she claims to be, but says nothing about the access rights of the individual.

Encryption The translation of data into a secret code. Encryption is the most effective way to achieve data security. To read an encrypted file, you must have access to a secret key or password that enables you to decrypt it.

MPPE Microsoft Point to Point Encryption (MPPE) is a means of representing Point to Point Protocol (PPP) packets in an encrypted form.

Broadcast Broadcasting sends a message to everyone on the network whereas multicasting sends a message to a select list of recipients.

Multicast To transmit a single message to a select group of recipients. A simple example of multicasting is sending an e-mail message to a mailing list. Teleconferencing and videoconferencing also use multicasting, but require more robust protocols and networks.

PPTP Point-to-Point Tunneling Protocol, a technology for creating Virtual Private Networks (VPNs). Because the Internet is essentially an open network, the Point-to-Point Tunneling Protocol (PPTP) is used to ensure that messages transmitted from one VPN node to another are secure. With PPTP, users can dial in to their corporate network via the Internet.

PPTP IP Security, a set of protocols developed to support secure exchange of packets at the IP layer. IPsec has been deployed widely to implement Virtual Private Networks (VPNs).

VPN A Virtual Private Network (VPN) is a private Network that makes use of the public telecommunication infrastructure, maintaining privacy through the use of a tunneling Protocol and security procedures.

100Base-T Also known as "Fast Ethernet," an Ethernet cable standard with a data transfer rate of up to 100 Mbps.

10Base-T An older Ethernet cable standard with a data transfer rate of up to 10 Mbps.

802.11, 802.11b A family of IEEE (Institute of Electrical and Electronics Engineers)-defined specifications for wireless networks. Includes the 802.11b standard, which supports high-speed (up to 11 Mbps) wireless data transmission.

802.3 The IEEE (Institute of Electrical and Electronics Engineers - defined specification that describes the characteristics of Ethernet (wired) connections.

Access point A device that exchanges data between computers on a network. An access point typically does not have any Firewall or NAT capabilities.

Ad hoc network A solely wireless computer-to-computer network. Unlike an infrastructure network, an ad hoc network does not include a gateway router.

Adapter Also known as a "network interface card" (NIC). An expansion card or other device used to provide network access to a computer, printer, or other device.

Administrator A person responsible for planning, configuring, and managing the day-to-day operation of a computer network. The duties of an administrator include installing new workstations and other devices, adding and removing individuals from the list of authorized users, archiving files, overseeing password protection and other security measures, monitoring usage of shared resources, and handling malfunctioning equipment.

Bandwidth The amount of information, or size of file, that can be sent through a network connection at one time. A connection with more bandwidth can transfer information more quickly.

Bridge A device that forwards packets of information from one segment of a network to another. A bridge forwards only those packets necessary for communication between the segments.

Broadband connection A high-speed connection, typically 256 Kbps or faster. Broadband services include cable modems and DSL.

Broadband modem A device that enables a broadband connection to access the Internet. The two most common types of broadband modems are cable modems, which rely on cable television infrastructure, and DSL modems, which rely on telephone lines operating at DSL speeds.

Bus A set of hardware lines used for data transfer among the components of a computer system. A bus essentially allows different parts of the system to share data. For example, a bus connects the disk-drive controller, memory, and input/output ports to the microprocessor.

Cable modem A device that enables a broadband connection to access the Internet. Cable modems rely on cable television infrastructure, in other words, the data travels on the same lines as you cable television.

CAT 5 cable Abbreviation for "Category 5 cable." A type of Ethernet cable that has a maximum data rate of 100 Mbps.

Channel A path or link through which information passes between two devices.

Client Any computer or program that connects to, or requests the services of, another computer or program on a network. For a local area network or the Internet, a client is a computer that uses shared network resources provided by a server.

Client/server network A network of two or more computers that rely on a central server to mediate the connections or provide additional system resources. This dependence on a server differentiating a client/server network from a peer-to-peer network.

Computer name A name that uniquely identifies a computer on the network so that all its shared resources can be accessed by other computers on the network. One computer name cannot be the same as any other computer or domain name on the network.

Crossover cable A type of cable that facilitates network communications. A crossover cable is a cable that is used to interconnect two computers by "crossing over" (reversing) their respective pin contacts.

DHCP Acronym for `Dynamic Host Configuration Protocol'. A TCP/IP protocol that automatically assigns temporary IP addresses to computers on a local area network (LAN). OpenRG supports the use of DHCP. You can use DHCP to share one Internet connection with multiple computers on a network.

Dial-up connection An Internet connection of limited duration that uses a public telephone network rather than a dedicated circuit or some other type of private network.

DMZ Acronym for `demilitarized zone'. A collection of devices and subnets placed between a private network and the Internet to help protect the private network from unauthorized Internet users.

DNS Acronym for `Domain Name System'. A data query service chiefly used on the Internet for translating host names into Internet addresses. The DNS database maps DNS domain names to IP addresses, so that users can locate computers and services through user-friendly names.

Domain In a networked computer environment, a collection of computers that share a common domain database and security policy. A domain is administered as a unit with common rules and procedures, and each domain has a unique name.

Domain name An address of a network connection that identifies the owner of that address in a hierarchical format: server.organization.type. For example, http://www.whitehouse.gov identifies the Web server at the WhiteHouse, which is part of the U.S. government.

Drive An area of storage that is formatted with a file system and has a drive letter. The storage can be a floppy disk (which is often represented by drive A), a hard disk (usually drive C), a CD-ROM (usually drive D), or another type of disk. You can view the contents of a drive by clicking the drive's icon in Windows Explorer or My Computer. Drive C (also known as the hard disk), contains the computer's operating system and the programs that have been installed on the computer. It also has the capacity to store many of the files and folders that you create.

Driver Within a networking context, a device that mediates communication between a computer and a network adapter installed on that computer.

DSL Acronym for `Digital Subscriber Line'. A constant, high-speed digital connection to the Internet that uses standard copper telephone wires.

DSL modem A device that enables a broadband connection to access the Internet. DSL modems rely on telephone lines that operate at DSL speeds.

Duplex A mode of connection. Full-duplex transmission allows for the simultaneous transfer of information between the sender and the receiver. Half-duplex transmission allows for the transfer of information in only one direction at a time.

Dynamic IP address The IP address assigned (using the DHCP protocol) to a device that requires it. A dynamic IP address can also be assigned to a gateway or router by an ISP.

Edge computer The computer on a network that connects the network to the Internet. Other devices on the network connect to this computer. The computer running the most current, reliable operating system is the best choice to designate as the edge computer.

Ethernet A networking standard that uses cables to provide network access. Ethernet is the most widely-installed technology to connect computers together.

Ethernet cable A type of cable that facilitates network communications. An Ethernet cable comes in a couple of flavors. there is twisted pair, and coax Ethernet cables. Each of these allow data to travel at 10Mbit per second.

Firewall A security system that helps protect a network from external threats, such as hacker attacks, originating outside the network. A hardware Firewall is a connection routing device that has specific data checking settings and that helps protect all of the devices connected to it.

Firmware Software information stored in nonvolatile memory on a device.

Flash memory A type of memory that does not lose data when power is removed from it. Flash memory is commonly used as a supplement to or replacement for hard disks in portable computers. In this context, flash memory either is built in to the unit or, more commonly, is available as a PC Card that can be plugged in to a PCMCIA slot.

FTP Acronym for `File Transfer Protocol'. The standard Internet protocol for downloading, or transferring, files from one computer to another.

Gateway A device that acts as a central point for networked devices, receives transmitted messages, and forwards them. OpenRG can link many computers on a single network, and can share an encrypted Internet connection with wired and wireless devices.

Gateway address The IP address you use when you make a connection outside your immediate network.

Hexadecimal A numbering system that uses 16 rather than 10 as the base for representing numbers. It is therefore referred to as a base-16 numbering system. The hexadecimal system uses the digits 0 through 9 and the letters A through F (uppercase or lowercase) to represent the decimal numbers 0 through 15. For example, the hexadecimal letter D represents the decimal number 13. One hexadecimal digit is equivalent to 4 bits, and 1 byte can be expressed by two hexadecimal digits.

HomePNA An industry standard that ensures that through existing telephone lines and a registered jack, computer users on a home network can share resources (such as an Internet connection, files, and printers) without interfering with regular telephone service. HomePNA currently offers data transmission speeds of up to 10 Mbps.

HomeRF An industry standard that combines 802.11b and portable phone standards for home networking. It uses frequency hopping (switching of radio frequencies within a given bandwidth to reduce the risk of unauthorized signal interception). HomeRF offers data transmission speeds of up to 1.6 Mbps at distances of up to 150 feet.

Host name The DNS name of a device on a network, used to simplify the process of locating computers on a network.

Hub A device that has multiple ports and that serves as a central connection point for communication lines from all devices on a network. When data arrives at one port, it is copied to the other ports.

IEEE Acronym for `Institute of Electrical and Electronics Engineers'. A society of engineering and electronics professionals that develops standards for the electrical, electronics, computer engineering, and science-related industries. The IEEE (Eye-triple-E) is a non-profit, technical professional association of more than 377,000 individual members in 150 countries. The full name is the Institute of Electrical and Electronics Engineers, Inc., although the organization is most popularly known and referred to by the letters I-E-E-E.

Infrastructure network A network configuration in which wireless devices connect to a wireless access point (such as OpenRG) instead of connecting to each other directly.

Internet domain In a networked computer environment, a collection of computers that share a common domain database and security policy. A domain is administered as a unit with common rules and procedures, and each domain has a unique name.

Intranet A network within an organization that uses Internet technologies (such a Web browser for viewing information) and protocols (such as TCP/IP), but is available only to certain people, such as employees of a company. Also called a private network. Some intranets offer access to the Internet, but such connections are directed through a Firewall.

IP Acronym for `Internet Protocol'. The protocol within TCP/IP that is used to send data between computers over the Internet. More specifically, this protocol governs the routing of data messages, which are transmitted in smaller components called packets.

IP address Acronym for `Internet Protocol' address. IP is the protocol within TCP/IP that is used to send data between computers over the Internet. An IP address is an assigned number used to identify a computer that is connected to a network through TCP/IP. An IP address consists of four numbers (each of which can be no greater than 255) separated by periods, such as 192.168.1.1.

ISO/OSI reference model Abbreviation for "International Organization for Standardization Open Systems Interconnection" reference model. An architecture that standardizes levels of service and types of interaction for computers that exchange information through a communications network. The ISO/OSI reference model separates computer-to-computer communications into seven protocol layers, or levels; each builds on and relies on the standards contained in the levels below it. The lowest of the seven layers deals solely with hardware links; the highest deals with software interactions at the program level. It is a fundamental blueprint designed to help guide the creation of hardware and software for networks.

ISP Acronym for `Internet service provider'. A company that provides individuals or companies access to the Internet.

Kbps Abbreviation of `kilobits per second'. Data transfer speed, as through a modem or on a network, measured in multiples of 1,000 bits per second.

LAN Acronym for `local area network'. A group of computers and other devices dispersed over a relatively limited area (for example, a building) and connected by a communications link that enables any device to interact with any other on the network.

MAC address Abbreviation for `media access control' address. The address that is used for communication between network adapters on the same subnet. Each network adapter is manufactured with its own unique MAC address.

MAC layer Abbreviation for `media access control' layer. The lower of two sub layers that make up the data-link layer in the ISO/OSI reference model. The MAC layer manages access to the physical network, so a protocol like Ethernet works at this layer.

mapping A process that allows one computer to communicate with a resource located on another computer on the network. For example, if you want to access a folder that resides on another computer, you "map to" that folder, as long as the computer that holds the folder has been configured to share it.

Mbps Abbreviation of `megabits per second'. A unit of bandwidth measurement that defines the speed at which information can be transferred through a network or Ethernet cable. One megabyte is roughly equivalent to eight megabits.

Modem A device that transmits and receives information between computers.

NAT Acronym for `network address translation'. The process of converting between IP addresses used within a private network and Internet IP addresses. NAT enables all of the computers on a network to share one IP address.

Network A collection of two or more computers that are connected to each other through wired or wireless means. These computers can share access to the Internet and the use of files, printers, and other equipment.

Network adapter Also known as a `network interface card' (NIC). An expansion card or other device used to provide network access to a computer, printer, or other device.

Network name The single name of a grouping of computers that are linked together to form a network.

Network printer A printer that is not connected directly to a computer, but is instead connected directly to a network through a wired or wireless connection.

Packet A unit of information transmitted as a whole from one device to another on a network.

PC Card A peripheral device that adds memory, mass storage, modem capability, or other networking services to portable computers.

PCI Acronym for `Peripheral Component Interconnect'. A specific bus type designed to be used with devices that have high bandwidth requirements.

PCI card A card designed to fit into a PCI expansion slot in a personal computer. PCI cards provide additional functionality; for example, two types of PCI cards are video adapters and network interface cards. See PCI.

PCI expansion slot A connection socket designed to accommodate PCI cards.

PCMCIA Acronym for `Personal Computer Memory Card International Association'. A nonprofit organization of manufacturers and vendors formed to promote a common technical standard for PC Card-based peripherals and the slot designed to hold them, primarily on portable computers and intelligent electronic devices.

Peer-to-peer network A network of two or more computers that communicate without using a central server. This lack of reliance on a server differentiates a peer-to-peer network from a client/server network.

PING A protocol for testing whether a particular computer is connected to the Internet by sending a packet to the computer's IP address and waiting for a response.

Plug and Play A set of specifications that allows a computer to automatically detect and configure various peripheral devices, such as monitors, modems, and printers.

Port A physical connection through which data is transferred between a computer and other devices (such as a monitor, modem, or printer), a network, or another computer. Also, a software channel for network communications.

PPPoE Acronym for `Point-to-Point Protocol over Ethernet'. A specification for connecting users on an Ethernet network to the Internet by using a broadband connection (typically through a DSL modem).

Profile A computer-based record that contains an individual network's software settings and identification information.

Protocol A set of rules that computers use to communicate with each other over a network.

Resource Any type of hardware (such as a modem or printer) or software (such as an application, file, or game) that users can share on a network.

Restore factory defaults The term used to describe the process of erasing your base station's current settings to restore factory settings. You accomplish this by pressing the Reset button and holding it for five or more seconds. Note that this is different from resetting the base station.

RJ-11 connector An attachment used to join a telephone line to a device such as a modem or the external telephone lines.

RJ-45 connector An attachment found on the ends of all Ethernet cables that connects Ethernet (wired) cables to other devices and computers

Server A computer that provides shared resources, such as storage space or processing power, to network users.

Shared folder A folder (on a computer) that has been made available for other people to use on a network.

Shared printer A printer (connected to a computer) that has been made available for other people to use on a network.

Sharing To make the resources associated with one computer available to users of other computers on a network.

SNTP Acronym for `Simple Network Time Protocol'. A protocol that enables client computers to synchronize their clocks with a time server over the Internet.

SSID Acronym for `Service Set Identifier', also known as a "wireless network name." An SSID value uniquely identifies your network and is case sensitive.

Static IP address A permanent Internet address of a computer (assigned by an ISP).

Straight-through cable A type of cable that facilitates network communications. An Ethernet cable comes in a couple of flavors. There is twisted pair, and coax Ethernet cables. Each of these allow data to travel at 10Mbit per second. Unlike the Crossover cable, straight-through cable has the same order of pin contacts on each end-plug of the cable.

Subnet A distinct network that forms part of a larger computer network. Subnets are connected through routers and can use a shared network address to connect to the Internet.

Subnet mask Typically, a subnet may represent all the machines at one geographic location, in one building, or on the same local area network (LAN). Having an organization's network divided into subnets allows it to be connected to the Internet with a single shared network address. Similar in form to an IP address and typically provided by an ISP. An example of a subnet mask value is 255.255.0.0.

Switch A central device that functions similarly to a hub, forwarding packets to specific ports rather than broadcasting every packet to every port. A switch is more efficient when used on a high-volume network.

Switched network A communications network that uses switching to establish a connection between parties.

Switching A communications method that uses temporary rather than permanent connections to establish a link or to route information between two parties. In computer networks, message switching and packet switching allow any two parties to exchange information. Messages are routed (switched) through intermediary stations that together serve to connect the sender and the receiver.

TCP/IP Acronym for `Transmission Control Protocol/Internet Protocol'. A networking protocol that allows computers to communicate across interconnected networks and the Internet. Every computer on the Internet communicates by using TCP/IP.

Throughput The data transfer rate of a network, measured as the number of kilobytes per second transmitted.

USB Acronym for `universal serial bus'. USB (Universal Serial Bus) is a plug-and-play interface between a computer and add-on devices (such as audio players, joysticks, keyboards, telephones, scanners, and printers). With USB, a new device can be added to your computer without having to add an adapter card or even having to turn the computer off.

USB adapter A device that connects to a USB port.

USB connector The plug end of the USB cable that is connected to a USB port. It is about half an inch wide, rectangular and somewhat flat.

USB port A rectangular slot in a computer into which a USB connector is inserted.

UTP Acronym for `unshielded twisted pair'. A cable that contains one or more twisted pairs of wires without additional shielding. It's more flexible and takes less space than a shielded twisted pair (STP) cable, but has less bandwidth.

Virtual server One of multiple Web sites running on the same server, each with a unique domain name and IP address.

WAN Acronym for `wide area network'. A geographically widespread network that might include many linked local area networks.

Wi-Fi A term commonly used to mean the wireless 802.11b standard.

Wireless Refers to technology that connects computers without the use of wires and cables. Wireless devices use radio transmission to connect computers on a network to one another. Radio signals can be transmitted through walls, ceilings, and floors, so you can connect computers that are in different rooms in the house without physically attaching them to one another.

Wireless access point A device that exchanges data between wireless computers or between wireless computers and wired computers on a network.

Wireless network name The single name of a grouping of computers that are linked together to form a network.

Wireless security A wireless network encryption mechanism that helps to protect data transmitted over wireless networks.

WLAN Acronym for "wireless local area network." A network that exclusively relies on wireless technology for device connections.

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Contact Jungo

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